

# FLIGHT

First Aero Weekly in the World.

Founder and Editor: STANLEY SPOONER.

A Journal devoted to the Interests, Practice, and Progress of Aerial Locomotion and Transport.

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## Flight.

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## EDITORIAL COMMENT.

### Our Aerial Fleet.

In dealing with the matter of our aerial defences we have at all times endeavoured to steer clear of alarmist tendencies and to give the naval and military authorities due credit for what they have accomplished in the teeth of Government apathy. Even in the matter of the Government attitude we have chosen to believe that the hand was being held, not because of any want of proper realisation that in the air may lie the future fate of the Empire, but that what many regarded as improper procrastination was simply a considered policy of awaiting developments until such time as it was wise to make a great forward move. But there comes a time when it is necessary to talk plainly and to say the things that come uppermost in the mind after a close and careful study of the relative strength of our own and other nations' air fleets. That time has come now. We have waited to see the awakening, and we have seen nothing but a continued policy of discouraging apathy, which has left this country hopelessly

behind its rivals, without an air fleet worthy of the name, and almost entirely at the mercy of the first aerial power which cares to launch its air squadrons on a mission of destruction across the North Sea. We sit idly down and watch France and Germany constantly building, constantly reinforcing their resources of both men and material, and our answer is, what! We play about with small dirigibles which are but of minor count for the purposes of serious war, while Germany rapidly and certainly builds huge craft, capable of taking the North Sea in their stride and which, if report is to be trusted, have already paid us visits by night. Not that we are inclined to take these reports too seriously, but the fact remains that even if German aircraft have not visited these shores it is beyond all question that there is nothing in the wide world, least of all British aircraft, to prevent them so doing whenever those directing them are inclined.

France has built up an enormously strong air fleet, and will have before long not less than five hundred aeroplanes in effective service, to say nothing of a respectable number of large dirigibles. What has been our reply to this? Three tiny dirigibles, and about a score of aeroplanes, with about half of them in effective commission! There may be a few more or less, but whether that is the exact number within one or two does not affect the matter one way or the other. True, France at the moment is our very good friend and ally, but political friendships are notoriously unstable, and even so, when did Great Britain have to depend upon her friends to supply her own obvious deficiencies? And what of the immediate future? It has been stated upon apparently good authority that it is intended to spend a round million on the air services during the coming financial year, but this statement is not based on any public official announcement and before it can be confirmed we must wait for some weeks yet for the publication of the Army Estimates. And supposing when those Estimates are given to the country that the information turns out to be incorrect? Is there any hope that the Parliamentary "Supers" who draw their £400 per annum for walking through the lobbies obedient to the crack of the Party whip will rise up in their places and insist that the safety of the country shall take precedence of schemes of so-called social reform, which no one wants and which are frankly designed to catch the votes of the unthinking populace? We fear not. True, there is Mr. Joynson-Hicks, an indefatigable

champion in the cause of aviation, and an Aerial Defence group in the House, which has done excellent work in calling attention to the parlous state of our air service. But this is isolated effort which is but the cry as of a voice in the wilderness. They do their best, but the protests fall on unheeding ears.

It is with something more than pleasure that we note that the *Daily Telegraph* has taken up this most vital question and speaks out in no uncertain manner. It points out that the policy of inaction is ripening to its inevitable conclusion, and, as we have already emphasised, that the British aviation industry is dying. Abroad, one improvement follows another with disconcerting rapidity, owing in every case to the researches and experiments of private firms. But it cannot be hoped that with our factories idle, with our expert designers and craftsmen dismissed and forced into other careers to make their livelihood, we can ever keep pace with, much less outstrip, foreign activity and improvement. Every other nation, every one of them possessing far greater experience of practical military aviation, has seen the vital necessity of equipping its army with war machines of a number of different types, even at great cost, knowing full well that practical experience *must* sooner or later be paid for, and with admirable judgment decide upon sooner. The time will come when the same necessity will be recognised by our own authorities, but by that time, if the present policy be persisted in, the aviation industry will have ceased to exist.

This is plain enough speaking, and the pity is that it is true to the letter. We repeat that we are not alarmists, but we cannot view the position without anything but the gravest misgiving for the future. The political outlook is darker than it has been for many years, and we have it on record that in the opinion of one of our most distinguished soldiers that it is impossible to make successful war without having command of the air. And if war should come suddenly, we most certainly shall not have command of the air—but the lamp-posts of Whitehall may have unfamiliar ornaments. And well it might be under the circumstances.



## QUESTIONS IN PARLIAMENT.

ON the 22nd ult. in the House of Commons.

Mr. Joynson-Hicks asked the Secretary of State for War whether the Royal Flying Corps possesses at the moment any proper transport for aeroplane squadrons travelling by road, whether the Royal Flying Corps possesses a motor-driven travelling workshop, and whether proper trailers which can be attached to motor cars exist for the purpose of carrying aeroplanes by road.

Col. Seely.—The military wing has motor vehicles for transport of the squadrons by road. The full equipment is not yet complete. The supply of a motor-driven travelling workshop is now in hand, and trailers of the nature mentioned are being manufactured.

Mr. Joynson-Hicks asked whether the 26 aeroplanes belonging to the military wing of the Royal Flying Corps, which are said to be in flying order, include a number of monoplanes recently delivered; if so, whether alterations are to be made in these monoplanes, whether they can be classed as being in flying order, and whether any officers of the Royal Flying Corps have had experience of flying these machines.

Col. Seeley.—The 26 aeroplanes mentioned include 13 monoplanes, of which only three have been delivered during the last three months. The monoplanes are being examined, and any improvement found to be necessary will be made. They are in flying order, though possibly some improvement may be desirable. The reply to the last part of the question is in the affirmative.

Mr. Joynson-Hicks asked whether, in view of the fact that it is the general custom in the Royal Flying Corps for an officer to fly the same machine, he will consider the advisability in the interests of the safety of such an officer that others should be prevented from flying his machine, and whether the absence of any hard and fast

### How Things are Done Abroad.

It is not very long ago that we dealt with the subject of British aeroplane engines, deploring the fact that we were compelled to go abroad for suitable motors in sufficient quantities to equip even the moderate number of aeroplanes built in England. At the time we suggested that here was a case in which Government encouragement might very usefully be given. We were not sanguine enough to believe that our appeal would be effective, therefore we are not as disappointed as might have been the case had our faith gone deeper. Anyway, nothing has been done. Now let us see what has been happening in the meantime in Germany. According to a telegram from Berlin, an Imperial rescript to the Minister of the Interior has been published, giving the results of the competition for the best German aeroplane motors. The Emperor's prize of £2,500 is awarded to the Benz firm; the Chancellor's prize of £1,500 is won by the Daimler concern, as is also the £500 given by the Minister of Marine. The War Minister's prize of £1,250 goes to the N.A.G. Co. Nearly six thousand pounds in prizes, and in addition the Emperor orders that a second competition is to be organised, the funds for prizes and expenses to be taken from the proceeds of the national aviation subscription! And we can manage to raise a thousand pounds, subscribed by a single public-spirited individual! It does not make us proud of our British nationality.



### Where is the Monoplane Report?

What has become of the long-delayed report on monoplanes in the Royal Flying Corps? Surely it is time it was issued, particularly as Col. Seely admitted many weeks ago that he was on the point of receiving it. Monoplanes are still under the ban, and yet Col. Seely has gracefully accepted the gift of a Blériot subscribed for by the students of the International Correspondence Schools. Presumably it would not have been accepted had the War Office authorities intended to place a permanent ban upon the type. But then the Government does some extraordinary things!

rule on this subject is due to the fact that there are insufficient machines to provide a separate machine for each officer who flies.

Col. Seely.—It is usual for officers in the Royal Flying Corps to fly the same machine, but by no means invariable. Quite apart from the question of the number of machines, it is not considered advisable to limit the discretion of officers commanding squadrons in allotting machines.

Mr. Joynson-Hicks asked whether it is advisable that officers who are on probation with the Royal Flying Corps should do their course of training on machines belonging to the military wing in view of the fact that such officers are liable to damage these machines, which ought, in fact, to be in a fit condition to be used on active service at short notice; whether he will consider the advisability of buying a number of smaller, low-powered, cheaper machines on which such officers should practise without risk of damage to the matériel of the fighting squadrons; whether a new high-powered and high-priced aeroplane was recently broken up by such a learner on the day of its delivery to the military wing; and whether, in the public interest, he will prevent money being expended in this way when we admittedly have an insufficient supply of aeroplanes both for tuition and active service purposes.

Col. Seely.—As regards the first part of the question, it is not proposed to interfere with the discretion of the officer commanding the military wing in this respect. As regards the second part of the question, the necessity of having aeroplanes for practice has been borne in mind in placing orders. The reply to the third part of the question is in the negative, and therefore the fourth part of the question does not arise.



FEBRUARY 1, 1913.

FLIGHT

# MEN OF MOMENT IN THE WORLD OF FLIGHT. Pioneer Pilot-Constructors.



MR. S. F. CODY.

## FLYING THE ALPS.

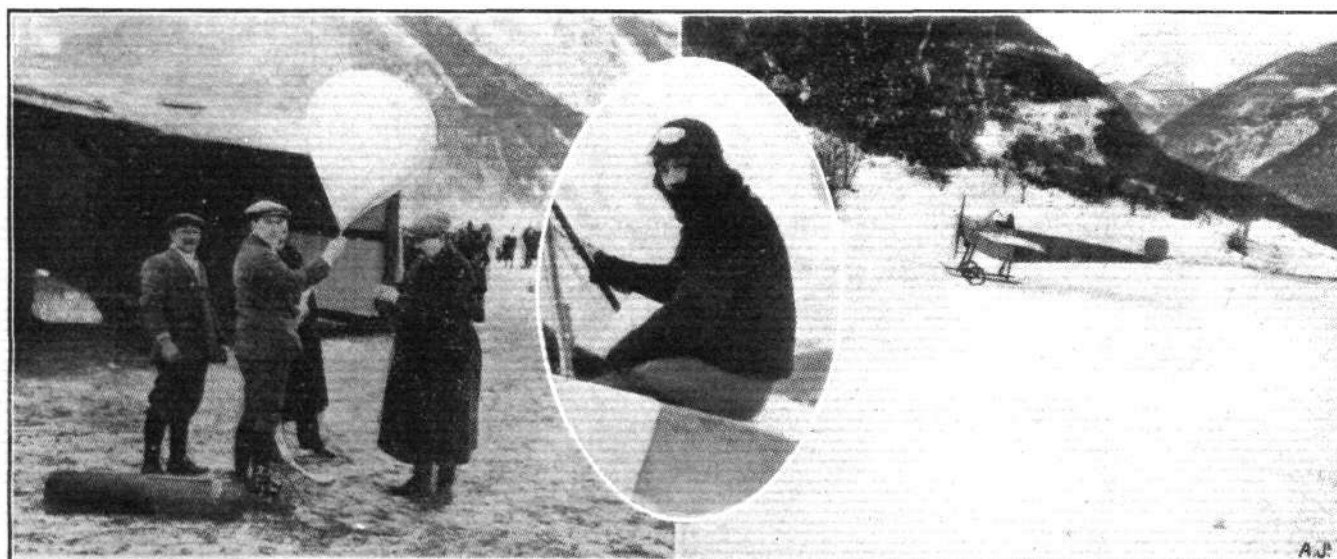
AFTER waiting over three weeks, and almost deciding to give up his attempt to cross the Alps, at any rate for the present, Bielovucic was confronted with a favourable opportunity on the 25th ult., and immediately took advantage of it. During the previous night and early morning there had been heavy falls of snow, but the conditions overhead were good, and so preparations were made for the start. The snow was cleared away to provide a getting-away ground, and the Hanriot machine, the slight damage sustained a fortnight previous having been made good, was thoroughly looked over. Satisfactory reports as to the weather in the Pass and at Domo d'Ossola were received, and at 12 o'clock "Bielo" had started from Brigue. Ascending spirally to a great height, he disappeared in the direction of the Simplon, passing over the Saltine ravine. He was continuing to rise, and there was an anxious moment when the engine suddenly stopped. Fortunately it started again, and in a few minutes the machine was over the Hospice. In fourteen minutes he had passed Simplon Village, and shortly after he was in sight of his goal. Carefully avoiding the dreaded Gondo Valley, he passed over the Monscera mountain and then *vol planed* down to within a hundred yards or so of the monument to his countryman, Chavez. He had taken 26 minutes for the trip for the distance of between 12 and 13 miles. The Hanriot machine which was used was equipped with an 80-h.p. Gnome driving a Chauviere propeller.



**BIELOVUCIC AND HIS ALPINE FLIGHT.**—The aviator in the air, with his machine, over the Reidberg, in the distance being seen the Simplon.



Bielovucic, the Peruvian aviator, who made a magnificent flight, on an 80-h.p. Gnome Hanriot with Chauviere propeller, on Saturday last, across the Alps, starting from Brigue *via* the Simplon, and alighting at Domodossola within a hundred yards of the spot where the unfortunate Chavez lost his life at the finish of his successful attempt to fly the Alps.



**BIELOVUCIC AND HIS ALPINE FLIGHT.**—In the centre Bielovucic ready for the start; on the left the aviator and M. Brisset testing the air currents by free ballonettes; and on the right Bielovucic landing in the snow after one of his preliminary trials.





FROM PAU TO MADRID BY AEROPLANE.—The journey of Bider on his Biériot on Friday last week, when he flew from Pont Long Aerodrome, starting at 7.19 a.m., crossed the Pyrenees, arriving at Guadalajara, where he alighted at 12 o'clock noon, re-starting from there at 1 p.m., and reaching the Quatre-Vents Aerodrome, Madrid, at 1.30 p.m., a distance of about 500 kiloms. in 5 hrs. 11 mins. Our picture shows M. Bider over the Pyrenees in the vicinity of the Pic du Midi d'Ossan.

## THE 35-H.P. GRAHAME-WHITE "POPULAR" BIPLANE.

LISTED at a price of under £400 complete with motor and all the usual accessories, this interesting product of the Grahame-White Co., which only made its appearance during the past week, is essentially the machine for the

hobby if it were only brought home to them that flying need not be such an expensive diversion as has been generally thought. For, after all, there is no fascination to compare with the fascination of flying.

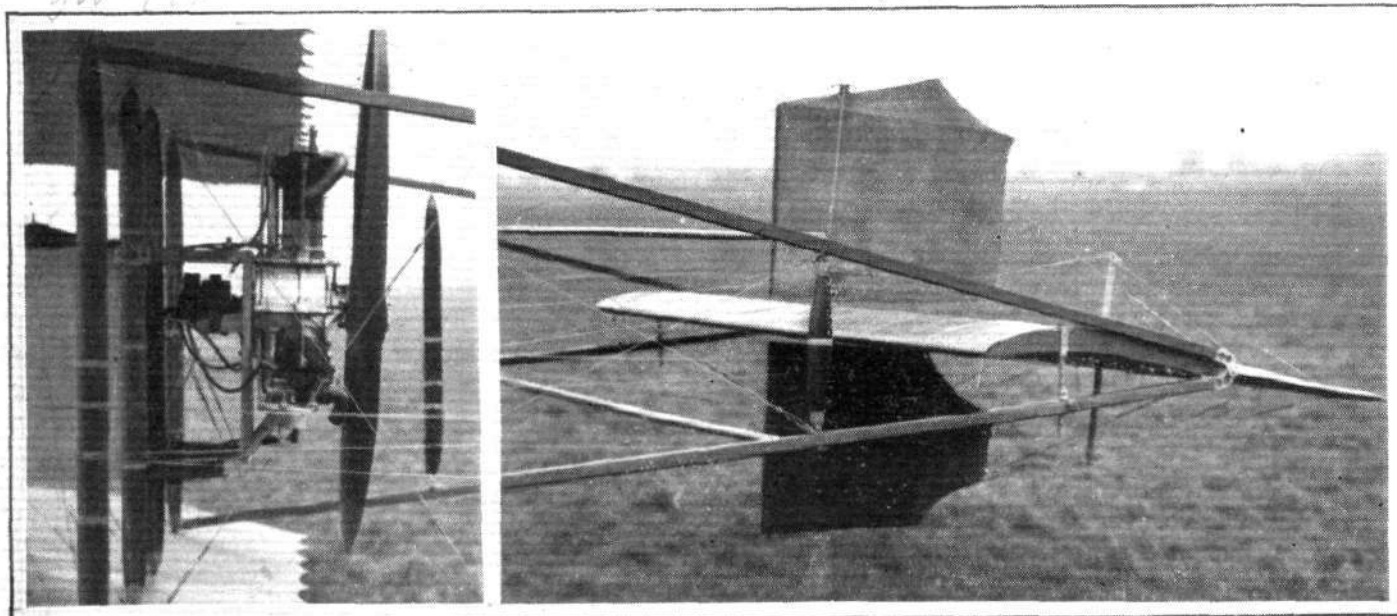


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THE 35-h.p. GRAHAME-WHITE BIPLANE.—Three-quarter front view.

man of moderate means. It is small, light, inexpensive in first cost and upkeep, simple and cheap to repair, and by no means difficult, we should think, to fly. Thus it makes a strong appeal to the exhibition flyer, the flying school proprietor, and the man who takes up aviation as a sport. Considering the latter type of man, there are

In general outline, as the reader will gather from our photographs, this new Grahame-White machine bears a resemblance to that very well-known French make of biplane—the Henry Farman. To our way of thinking this fact does not make the machine any the less interesting. Rather do we admire the Grahame-White Co.'s



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TWO DETAILS OF THE NEW GRAHAME-WHITE "POPULAR" BIPLANE.—On the left, the mounting of the 35-h.p. Y-type Anzani motor, on the right the tail unit.

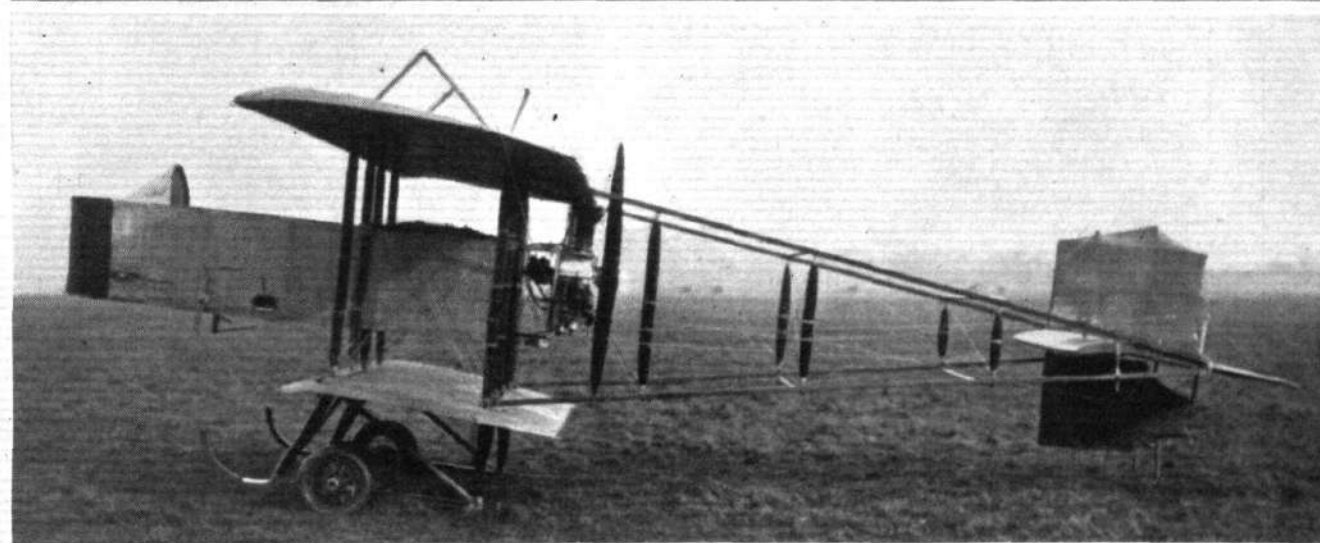
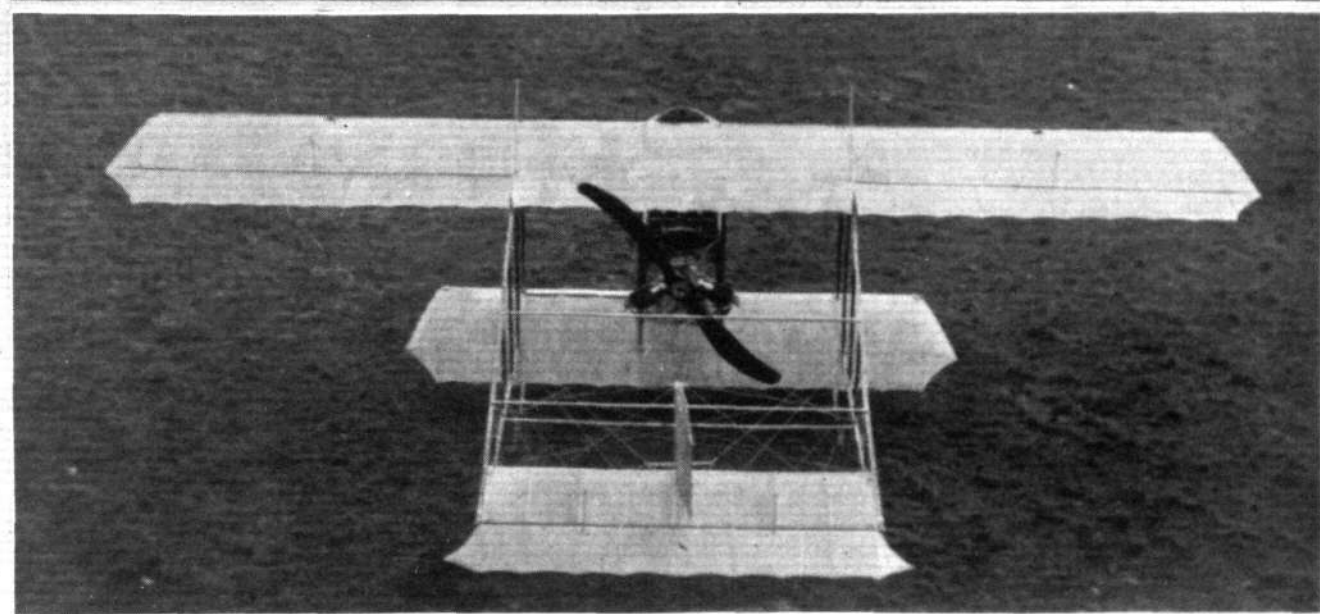
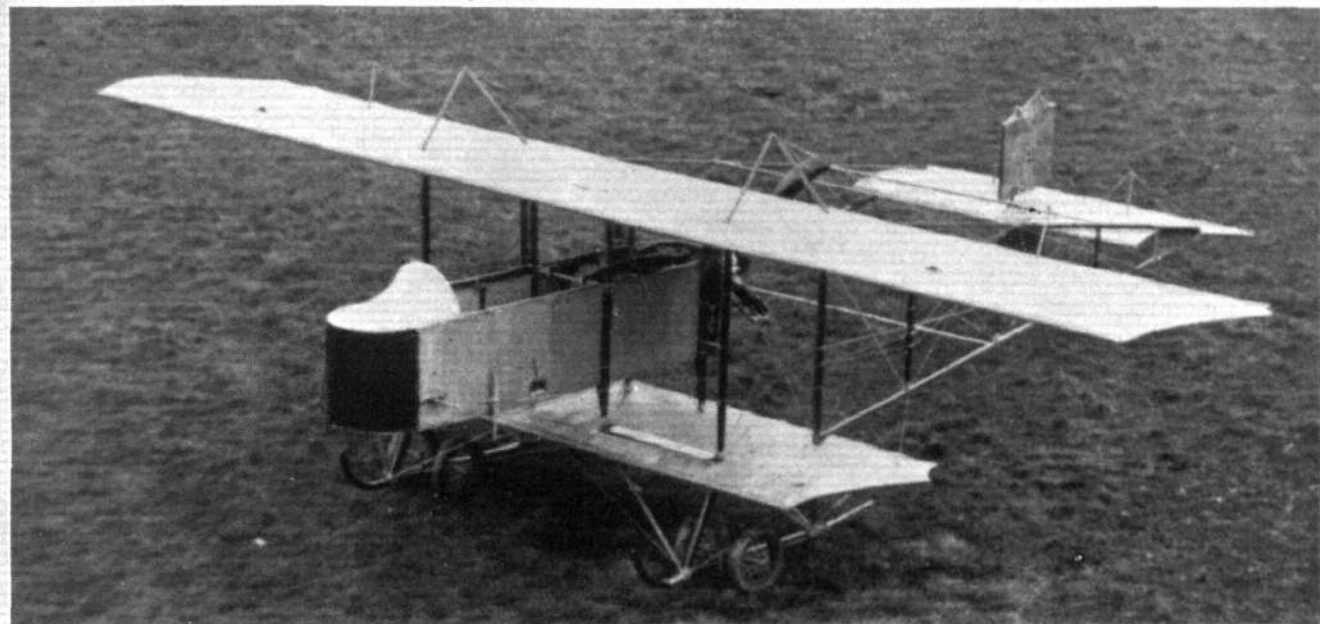
very few, and they are very far between, who quite see the point of laying out the more usual price of £1,000 in acquiring a machine with which he can make an occasional cross-country flight. There ought to be many comfortably well off sportsmen who would take up flying as a

policy in basing their machine on a design that, in France, has probably brought its originators a greater commercial success than has been achieved by any other aeroplane manufacturing firm we could mention.

The main lifting surfaces of the machine are con-

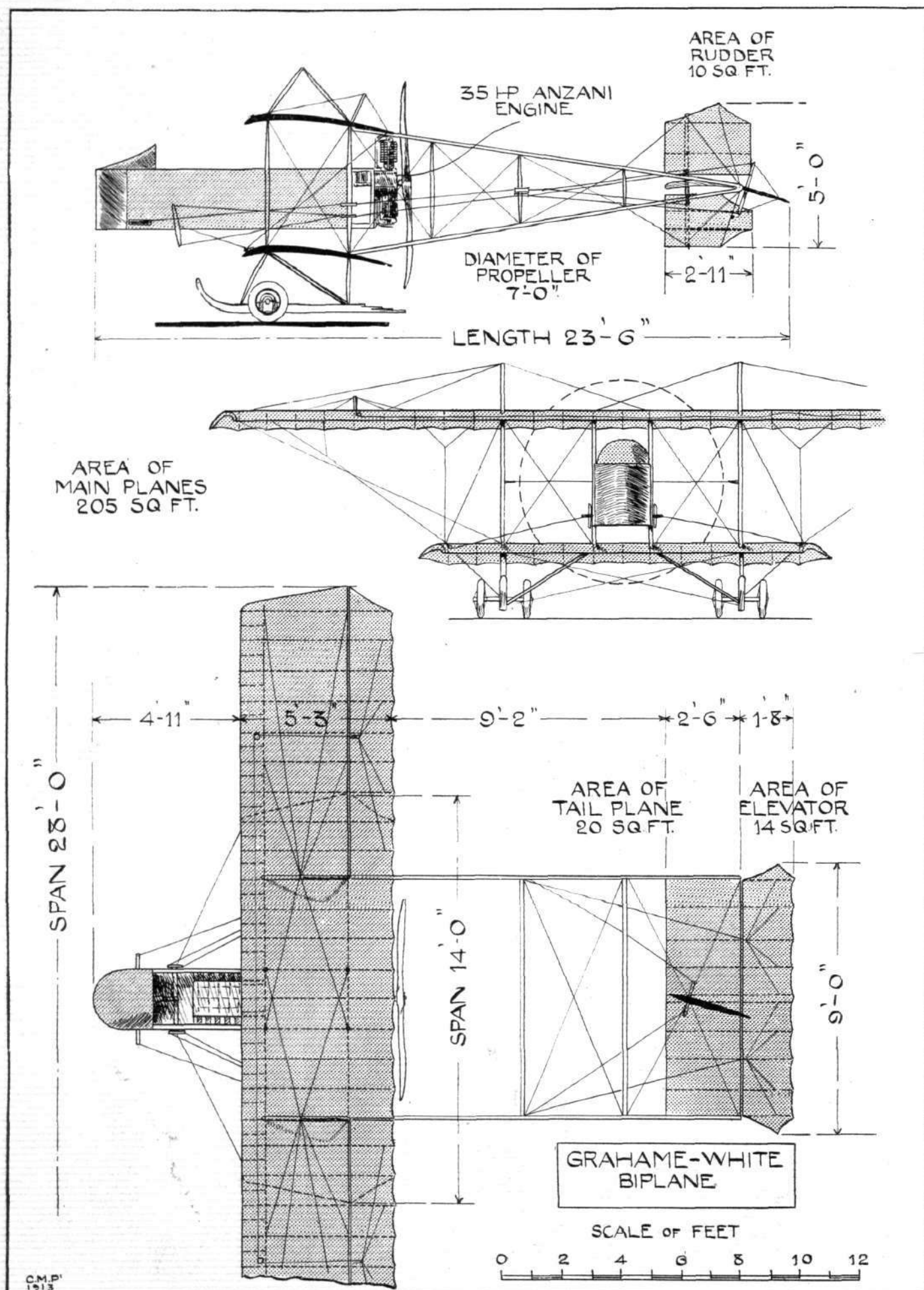


*all in glw 34p*



General view of the new 35-h.p. Grahame-White "Popular" biplane.

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THE 35-h.p. GRAHAME-WHITE "POPULAR" BIPLANE.—Front and side elevations and plan to scale.

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stituted by two planes, 28 ft. and 14 ft. respectively, in span, set at an angle of  $5^\circ$  of incidence, and braced together by heavy-gauge piano wire and separated by eight hollow struts in two ranks. The four centre struts—for they support the body—are of ash, the outer ones are of spruce. The planes are built about two main ash spars, both of I-section, and the ribs occur at every foot, approximately, along their length. At those points at which vertical struts are attached to the spars, the ribs used are of the hollow box variety; in other places, they are built up, I-section, with spruce flanges and three-ply distance pieces. To better maintain the shape of the plane, false ribs, extending from the leading edge to the front spar, are arranged midway between each main rib, and a pair of longitudinal stringers are run, at a point midway between front and rear spars, from one end of the plane to the other. The cross-section employed is that of the later 50-h.p. Gnome-Blériot wing, the one that Eiffel refers to in his work on wing sections as Aile No. 13 bis. Lateral control of the machine is maintained by two balancing flaps, each of 7 ft. span, hinged to the rear spar at either end of the top plane. They work in conjunction, and are connected one to the other by stranded steel cables, which pass over red fibre pulleys clamped to the front spar.

The landing-gear is of a type which, if it cannot be said of it that it is original, still maintains its own as probably the most serviceable type of undercarriage ever devised. The skids are of ash, and each supports its side of the machine through two vertical ash struts and three steel

tubes, which are arranged to give the maximum of rigidity. Throughout its length between the attachments of the vertical struts, each skid is spindled down to an I-section, and the overhang behind the rear vertical strut is laminated and made flexible in such a way that it may take the weight in landing of the rear part of the machine. Thus we find that the tail skid has been suppressed, as it has been in many machines of late. Of the strength of the chassis there can be little doubt, since the struts have an ample cross-section, and they are only about 18 ins. in length.

Ash outriggers support the tail, and they are braced by a steel wire and by vertical hollow wooden struts, and horizontal steel tubes. For lightness' sake the outriggers are hollowed out to I-section between those points where bolts pass through them to anchor the sockets accommodating the vertical and horizontal cross-members. The tail, being cambered and set at a positive angle of  $2^\circ$ , does a small share of the total lift. Behind it are the two elevator-flaps by which the attitude of the machine is controlled.

The body of the machine, in which the pilot sits, where are accommodated the fuel tanks, and to which the motor is mounted, is essentially a box girder some 12 ft. in length, built up of ash longitudinals, cross-members of oval-section steel tubing, and vertical members of spruce and ash. It is enclosed in front by three-ply wood, and along its sides by fabric. At its rear end it is capped by a flanged steel plate, to which the motor, a 35-h.p. Anzani of the very popular Y-type, is bolted. It drives a propeller of 2'100 m. diameter and 1'500 m. pitch. This propeller, by the way, has been designed by Mr. J. D. North, who is also responsible for the general and detail design of the machine under review. In shape it is somewhat reminiscent of, and yet unlike, the Levasseur propeller, for the fact that its blades, scythe-shaped, revolve point first. The cross-section of its blades, however, is different, for, on what may be considered as the under surface of the blade, Mr. North has made use of the return curve. It is interesting to record that a static thrust of 310 lbs. has been obtained from an exactly similar propeller driven by a similar engine.

Including four hours' supply of petrol and oil, and with the pilot on board, the weight of the machine comes out at slightly over 600 lbs., and thus its surface loading is, approximately speaking, 3 lbs. to the sq. ft. Its average flying speed is estimated at 50 miles an hour.



#### Handing Over the I.C.S. Blériot.

THE formal presentation of the I.C.S. Blériot monoplane took place at the War Office on the 28th ult., when Col. Seely received a deputation, introduced by Lord Desborough, and including Lord Montagu of Beaulieu, Sir Joseph Ward, and the Agents-General of the majority of British Colonies. The machine is the one on which Mr. Bertram Slack made his tour of Great Britain, and it was purchased by students of the International Correspondence Schools, by subscriptions, the maximum amount of any donation being one shilling. In accepting the gift Col. Seely said that a machine which could be flown 1,700 miles without any mishap was well worth having, but he appreciated still more the splendid spirit which had prompted the gift. The deputation was unique among the many he had received. All before had come to ask him for something, but they came to give him something. They gave him something which would be very useful to the War Office, and he expressed his thanks and the thanks of the Government.

Subsequently at a banquet held at the Westminster Palace Hotel, at which Mr. G. A. Seitz presided, Col. Seely said he could assure the company that the War Office were not losing sight of the national importance of the science of aviation. He was not going to anticipate the statement he would have to make in Parliament shortly, but he thought he might say that a remarkable advance had been made in this country, not only in the War Office, but outside, in the science of aviation.



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The producers of the new Grahame-White machine. On the right Mr. T. R. Gates, the commercial head of the Grahame-White Aviation Co., Ltd.; on the left Mr. J. D. North, their designer.

## SOME THOUGHTS ON STABILITY AND CONTROL.

By A. E. BERRIMAN.

(Continued from page 87.)

### IV. Longitudinal Stability. The Range of the Front Elevator. The Stability of the Double Curve Wing.

PART of the hypothesis under which the problem of lateral stability has been discussed, assumed the aeroplane to possess sensitive longitudinal stability of the weathercock kind. Weathercock longitudinal stability, as the term itself implies, means that the system tilts and dips in sympathy with the trend of the relative wind in the vertical plane. In fine, the assumption of sensitive weathercock longitudinal stability lays down as an hypothesis that the wings shall preserve a constant angle of incidence.

The assumption was primarily necessary in order to satisfy the conditions involved in the definition of a gust as a sudden relative spin of the wind. It is self-evident that the change of the wind's direction may take place in the vertical as well as the horizontal plane, and it is essential that the movement in the former direction should not be ignored. By assuming weathercock longitudinal stability in the hypothesis, it became possible to regard all lateral disturbances due to the real wind as originated by movements in the horizontal plane of the system—hence the definition of a gust as a relative spin.

In order to consider the problem of stability at all, it is necessary, it seems to me, to lay down some sort of definition of the disturbances that it is proposed to meet and the limitations of the treatment of the subject are necessarily governed by those of the hypothesis itself. Comparatively little is known about those aspects of meteorology that most concern the pilot of an aeroplane, and every day it becomes more apparent that the better understanding of this branch of the subject is of vital consequence to the furtherance of safety in flight. It can, however, do no harm and may indeed be productive of useful results to consider the problem from the standpoint of an arbitrary definition as I have endeavoured to do in these articles, for when the complete data is unavailable it is often helpful to spend some time in the study of an incomplete section, provided always that the limitations of the hypothesis be held well in mind.

Moreover, it appears to me that the conditions represented by strong vertical currents, such as may be encountered over the sun-heated plains of India and Mexico, and to a lesser extent may be expected to exist over the rivers and lakes of England, are not such as may lightly be included in the study as part of the problem to be solved by a general equation. Their danger lies as much in their power to affect the altitude of flight as in their disturbance of equilibrium, and whosoever would avoid being trapped over water or behind barriers that suddenly become impassable, must rely more on his knowledge of meteorology than on the inherent stability of his machine.

Thus in so far as it may sometimes appear as if the "stability question" is to be regarded as representing the whole problem of safety in flight, I personally look upon it as one factor therein only and upon the stable aeroplane or the "safe control," which I have suggested as a possibly preferable compromise, as merely incidental to the general perfection of the art of flying. Adequate engine power, and, above all, its reliability of action are essential to safety apart from every other consideration, and no amount of inherent stability will save the pilot from trouble who wilfully leaves the home field with a weak motor on the off-chance that it may pick up its proper form in the air.

The assumption of a constant angle of incidence to the relative wind may seem at first sight to be a singularly limited hypothesis from the standpoint of practical aviation, seeing that the whole basis of speed range in modern aeroplanes lies in the ability to vary the effective angle by the use of the elevator. Even in so far as the assumption draws particular attention to the purpose and use to which the elevator is now put, however, it serves somewhat of an utilitarian purpose—for in this very ability so to control the attitude of the machine in flight the pilot is given a power that is not wholly free from danger.

Let us consider for a moment the elementary situation presented by sensitive weathercock longitudinal stability such as is, for example, presented by the flight of the ballasted flat plate, which serves so admirably as a fundamental experiment in aerodynamics. Thus the c.g. of the system is well forward and coincides normally with the centre of pressure. If the angle of incidence should tend to become finer than is proper to the normal conditions, the c.p. advances still further forward and at once introduces a restoring couple that tends to maintain the angle of attack unchanged: the same when the angle increases and the c.p. retreats.

A cambered wing of single curvature, that is to say, one in which the surface is wholly concave to the chord, presents precisely the opposite phenomena. When the angle is very fine indeed the c.p.

may be nearer the trailing edge than the leading edge. As the angle is increased the c.p. moves forward, but when a certain critical angle is reached the c.p. begins to retreat. Finally it coincides with the centre of surface when the wing stands upright against the wind.

In flight it is only with the finer angles, those below the critical angle, that we have to deal, and the point of importance that it is necessary to bear in mind is that the natural direction of the travel of the c.p. on a cambered wing of single curvature is the wrong way for inherent stability.

A tail set at a lesser angle of incidence confers on the system as a whole a fore-and-aft dihedral angle which is a stabilising principle inasmuch as the variation of the total pressure on the tail plane at different angles is of such a magnitude as to cause the c.p. on the system to have a stable direction of travel.

The local travel of the c.p. on the wings is unaffected in itself, but its effect is neutralised. The presence of this tail at so great a distance from the main wings, however, adds weight, and probably decreases the sensitiveness of the system by its damping effect.

In the early Wright biplanes the fore and aft dihedral was obtained by holding the front elevator at a greater angle than the planes, and so depended entirely on the pilot. Moreover, the transverse pivot of the system being behind the organ of control produced a combination that was essentially unstable in certain limiting conditions, such as the dive, when an excessive use of the elevator to flatten out might conceivably "take charge" and turn the machine completely over in mid air. A tail in its natural position behind the transverse axis tends to remain there and a fixed tail plane in that place tends to prevent unpleasant consequences ensuing from the incautious use of a front elevator under such circumstances.

Taking the system represented by wings of single curvature in conjunction with a fixed tail plane, whether load-carrying or neutral, the result is a tendency towards weathercock longitudinal stability. As that is, therefore, what modern designers try to acquire, it seems not inappropriate to adopt this quality as an hypothesis in preceding arguments. Furthermore, if the machine possessed no elevator, the angle of incidence would tend to be invariable, and the horizontal flight speed a fixed quantity.

An elevator is necessary, however, for the reason that weathercock stability represents a state of oscillation rather than steadiness, and it is essential to give the pilot means for steadying his machine at his discretion. The elevator held at an angle, however, virtually increases or decreases the effective angle of the tail, and by so doing it temporarily alters the neutral axis about which the machine is the stable equilibrium.

As a means of intelligently opposing the oscillations of recovery, so as to increase the steadiness of flight, the elevator performs its proper and legitimate purpose. Its secondary use, which has become of even greater consequence in practical flying, however, is that indicated above, in which the resetting of the neutral axis of equilibrium causes a temporary change in the angle of incidence of the wings and so alters the speed at which the machine is supported in horizontal flight.

In this way variable speed is acquired with modern aeroplanes, and the practice being only safe within limits is thus open to abuse either through lack of appreciation of the consequences or through over-confidence in personal skill.

There is, as has been shown, a normal attitude in which the system is stable, with the elevator neutral, and consequently the pilot has at his command means for altering the horizontal speed either in such a way that it is reduced or increased in value. In the former case the limiting condition is reached when the aeroplane gets "stalled" through, becoming excessively *cabré*.

This attitude is dangerous in so far as it is a position from which it is impossible safely to extricate the machine without diving and this sort of dive seems often to involve more head room than most people have seen reason to suppose is necessary.

Whether the need for horizontal speed range as at present obtained is of fundamental importance is a question that involves other matters than those of stability, but it seems important to realise the possibilities that attend this method. Neither the *cabré* nor the *vol piqué* attitudes should be possible with weathercock longitudinal stability that is not tampered with by the holding of the elevator at abnormal angles for considerable periods of time.

The presence of a tail, it has been explained, is due to the inherent instability of the cambered wing of single curvature, but in modern machines the tail organs include an equally important member in the rudder. As, however, the preceding discussion on directional and lateral stability has shown the apparent uselessness of



a rudder on a stable system, it becomes of interest to consider the possibility of abandoning the tail altogether.

This would only be possible in a wing section inherently possessed of weathercock stability and none such appears to be in actual use. On the other hand, the latest research of Eiffel has drawn attention to the apparent existence of this quality in wings of the upturned trailing edge type, which have also been investigated by Mr. Turnbull at his laboratory in Rothesay, N.B., Canada, and sometimes are called by his name.

Given an inherently stable wing with reasonable aerodynamic efficiency, and the need for the long tail should disappear, for an elevator near at hand might well suffice to damp a system having so

much less inertia to rotation about its transverse axis. With the removal of the long tail would disappear also the long fuselage which at present serves no other purpose than to carry these organs of control and to add a very undesirable amount of weight.

Reverting to the use of negative wing tips, and in particular to the Dunne aeroplane on which this principle is in use, the retreated wings of this machine constitute a tail in principle, for they stand back behind the c.g. a very considerable distance. Moreover, it will be observed that the negative angle of the tips in this position constitute a fore and aft dihedral with the positive central portion of the wing, and so introduce the fundamental principle of weathercock longitudinal stability.



## The Royal Aero Club of the United Kingdom

OFFICIAL NOTICES TO MEMBERS

### Annual General Meeting.

The Annual General Meeting of the Members of the Royal Aero Club of the United Kingdom will be held on Wednesday, March 19th, 1913, at 4 o'clock, at 166, Piccadilly, London, W.

Notices of motion for the Annual General Meeting must be received by the Secretary not less than twenty-one days before the meeting, and must be signed by at least five members. Wednesday, February 26th, 1913, is the last day for the receipt of notices of motion.

### Committee.

In accordance with the rules, the Committee shall consist of eighteen members. Members are elected to serve for two years, half the Committee retiring annually. Retiring members are eligible for re-election.

The retiring members of the committee are:—

|                                       |                                    |
|---------------------------------------|------------------------------------|
| Griffith Brewer.                      | Prof. A. K. Huntington.            |
| Capt. Bertram Dickson, R.F.A.         | F. K. McClean.                     |
| John D. Dunville.                     | Alec Ogilvie.                      |
| Col. H. C. L. Holden, C.B.,<br>F.R.S. | Mervyn O'Gorman.<br>C. F. Pollock. |

Any two members of the Club can nominate a member to serve on the Committee, having previously obtained such member's consent. The name of such member so nominated, with the names of his proposer and seconder, must be sent to the Secretary in writing not less than fourteen days before the Annual General Meeting. Wednesday, March 5th, is the last day for the receipt of nominations.

Members are reminded that a ballot paper for the election of nine candidates to seats on the Committee of the Club will be forwarded to them at least seven days before the date of the Annual General Meeting.

### Aviators' Certificates.

The following Aviators' Certificates were also granted by the Committee at its meeting on January 21st, 1913:—

- 396. Sub. Lieut. Arthur Wellesley Bigsworth, R.N.R. (Bristol Biplane, Bristol School, Salisbury Plain).
- 405. Sub. Lieut. H. A. Littleton, R.N.V.R. (Bristol Biplane, Bristol School, Salisbury Plain).

### Public Safety and Accidents Investigation Committee.

A meeting of this Committee was held on Monday, January 27th,

### THE ROYAL FLYING CORPS.

THE following appointments were announced in the *London Gazette* of the 24th ult.:—

**R.F.C.—Military Wing.**—Capt. Charles Darbyshire, 4th Battalion the Lancashire Fusiliers, to be a flying officer and to be seconded. Dated November 7th, 1912.

Second Lieut. Collins P. Pizey, Special Reserve, is appointed to the Reserve. Dated January 25th, 1913.

**Special Reserve of Officers.**—The undermentioned to be Second Lieutenants (on probation). Dated January 25th, 1913:—Francis William Henry Lerwill, Henry Richard Busteed, and Edward Newman Fuller.

The following appointment was announced in the *London Gazette* of the 28th ult.:—

**Special Reserve of Officers.**—Christopher William Wilson to be Second Lieutenant (on probation). Dated January 29th, 1913.

The following appointment was announced by the Admiralty on the 24th ult.:—

1913, at the Royal Automobile Club (by kind permission), a 8 o'clock, when there were present: Col. H. C. L. Holden, C.B., F.R.S., in the Chair, Mr. A. E. Berriman, Mr. G. B. Cockburn, Mr. W. O. Manning, and Mr. Mervyn O'Gorman.

**Erith Accident.**—The report on this Accident was drawn up and ordered to be submitted to the Executive Committee with a recommendation that it be published in extenso.

### Annual Dinner.

The Annual Dinner will take place at the Royal Automobile Club, Pall Mall, S.W. (by kind permission), on Thursday, March 6th, 1913, at 7.30 for 8 o'clock.

### Gordon-Bennett Aviation Cup.

The cup having been won by a representative of the Aero Club de France, the race for 1913 will take place in France. The nature of the contest and the exact time and place will be announced later.

Each club affiliated to the *Fédération Aéronautique Internationale* has the right to challenge the holder, the Aero Club de France, and such challenge must be sent in before March 1st, 1913.

The Committee of the Royal Aero Club will select the three competitors to represent the British Empire, and intending candidates are requested to notify the Secretary on or before February 25th, 1913, of their willingness to compete, if chosen. Applications must be accompanied by a cheque for £20, the entry fee, which amount will be returned should the entrant not be selected.

### International Aero Show at Olympia.

The International Aero Show organised by the Society of Motor Manufacturers and Traders, supported by the Royal Aero Club, will be held at Olympia from February 14th to 22nd, 1913.

In connection with this Exhibition, a section for models will be organised by the Royal Aero Club, assisted by the Kite and Model Aeroplane Association. The Royal Aero Club will offer prizes amounting to £50 in this section. The entries close on Wednesday, February 5th, 1913, and full particulars can be obtained from the Secretary of the Royal Aero Club.

Members of the Royal Aero Club are admitted free on presentation of their membership cards.

A room in the Princes' Gallery will be placed at the disposal of the members during the exhibition.

166, Piccadilly.

HAROLD E. PERRIN, Secretary.

Lieut. C. L. Courtney, to the *Acton*, additional, as Flying Officer, to date January 7th.



### New Rules for French Military Brevets.

THE regulations governing the issue of military or superior *brevets* in France have again been revised by the military authorities. In future the three practical events will consist of (1) a triangular flight of at least 200 kiloms., with the shortest side at least 20 kiloms. long, and with two landings at predetermined points; (2) a non-stop flight of 150 kiloms. in a straight line to a point indicated beforehand, and (3) a similar flight but with one stop en route. In the course of these events the pilot must make one flight of at least 45 minutes' duration at a minimum height of 800 metres. In addition there will be a theoretical examination in three parts (1) map-reading, meteorology, &c.; (2) theory, construction, &c., of aeroplanes, and (3) principles and working of motors.

## FROM THE BRITISH FLYING GROUNDS.

### Brooklands Aerodrome.

Messrs. Barnwell and Knight made several good circuits on the Vickers monoplane on Saturday last. Messrs. Merriam and Bendall were out on the Bristol biplane, and the new Coventry Ordnance biplane was undergoing further "tuning up."

There was a good attendance of spectators Sunday, but owing to the uncertain state of the wind and the fact that several machines were *hors de combat* owing to mishaps, no competition was held. But there was some very interesting flying. Mr. Raynham was on the Coventry Ordnance biplane. Mr. Spencer carried passengers on the Spencer biplane. Messrs. Merriam and Bendall were flying solo and with pupils on the Bristol biplane. Cross-country flights were indulged in by Messrs. Barnwell and Knight on the No. 5 Vickers monoplane. Mr. Merriam finished up the afternoon with one of his customary spiral *vol planés* from a height of 1,000 ft. with engine cut off.

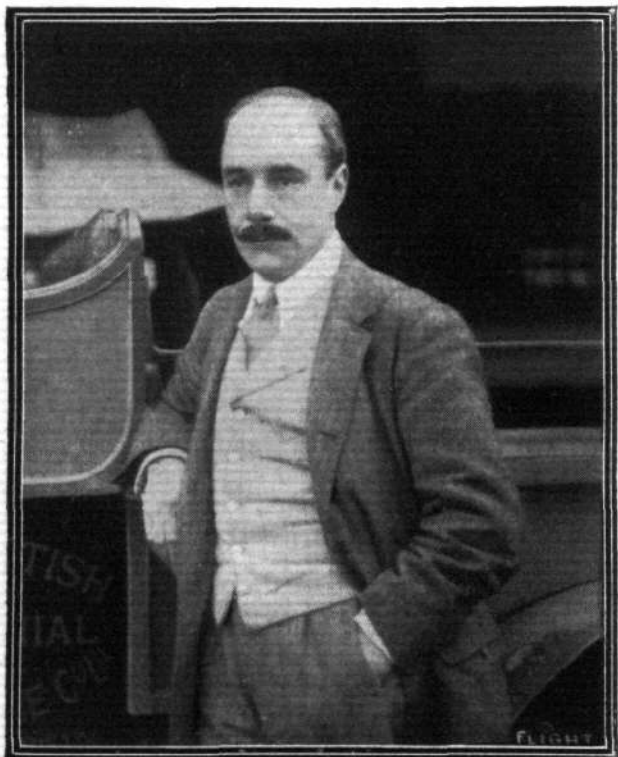
Entries for Quick-Starting Competition, to-day, Saturday: Messrs. Merriam and Bendall (Bristol biplanes), Mr. Spencer (Spencer biplane), Messrs. Knight and Barnwell (Vickers-Farman biplane), Mr. Hawker (Sopwith tractor biplane).

To-morrow, Sunday, a Speed Handicap has been arranged in which the following will compete: Mr. Hawker (Sopwith tractor biplane), Mr. Barnwell (Vickers monoplane), Mr. Knight (Vickers-Farman biplane), Messrs. Merriam and Bendall (Bristol biplanes), Mr. Spencer (Spencer biplane).

**Bristol School.**—Weather extremely bad all day Monday last week, rendering flying impossible. No improvement in weather on Tuesday, and all thought of outdoor work abandoned.

On Wednesday, Merriam was, as usual, first out for test, and finding weather more suitable, went up as passenger to Lieut. Crawford Kehrman for straights, this pupil then out for his first solo, doing very well. Mr. Neville was out for a couple of straights, afterwards completing his first circuits in excellent style. Bendall was giving landing practice to Mr. Archer, this pupil making good progress. Mr. Lane was giving a good exhibition, first with a couple of circuits, and then with several good figures of eight. Lieuts. Blatherwick and MacLean were both getting in some useful practice at straight flights.

Bendall was out after breakfast for a trial, having Lieut. MacLean as passenger. Mr. Lane was up for a solo with figures of eight, and good landing. Mr. Neville also made a couple of good flights, completing two circuits. Lieuts. Blatherwick, MacLean, and Crawford Kehrman were all out for straights, Merriam finishing morning's work by taking Mr. Archer for a high flight with spiral *vol plané* over hangars.



Capt. Rickards, one of the latest pupils of the Bristol School at Brooklands to secure his Royal Aero Club certificate last week.

In the afternoon Bendall took Mr. Archer for a test, Mr. Lane following with solo and figures of eight. Lieuts. Blatherwick, MacLean, and Crawford Kehrman were out for straights, Mr. Neville going for two solos doing right-hand turns. Merriam went up for further test and found conditions too bumpy for any more flying.

Flying was impossible all day Thursday, owing to heavy rain and wind, and on Friday, rain and wind prevented outdoor work all day.

Bendall made a test first thing Saturday, but found weather too bad. Merriam was out in the afternoon for a trial, afterwards ascending as passenger with Mr. Archer on straights, this same pupil then going alone for the first time, and doing quite well. Merriam finished up by going for a solo.

On Sunday, Merriam first of all made a test, then up behind Mr. Archer for straights and landing practice, after which this pupil carried out several good straights alone. Mr. Neville was out for an excellent solo, describing figures of eight, as also was Mr. Lane, both of these pupils being nearly ready for their certificates. Lieuts. MacLean and Blatherwick were both doing good straights, Bendall finishing morning's work by taking Lieut. MacLean for a flight. Bendall was out for a test in the afternoon, Mr. Lane as passenger, but found weather rather bumpy—too bad for pupils alone. Lieut. Blatherwick and Mr. Archer were both taken by Merriam for further trials, who finished the school work with a spiral from a good height.

**Vickers School.**—Capt. Wood and Barnwell doing straights Wednesday, last week, on Farman before breakfast, testing for adjustment. In the afternoon Knight was testing Farman biplane and No. 5 monoplane. Friday, Barnwell made a few circuits in the afternoon in a 30-m.p.h. wind on No. 5 monoplane, to test compass, and on Saturday and Sunday, in the afternoon, both Barnwell and Knight made some flights on No. 5 each day.

### Eastbourne Aerodrome.

On Wednesday morning, last week, Fowler had the Sommer out for the first time and made several flights on it. The old 'bus, which has been thoroughly overhauled and re-canvassed looked quite smart and flew very well. In the afternoon Fowler was out again on the Sommer doing figure eights. Gassler also put up two excellent flights on the 35-h.p. Anzani-Blériot, his landings being particularly good.

Thursday and Friday were somewhat too windy for practice, but on Saturday afternoon the wind died down to almost a dead calm. After making a solo on the Bristol, Fowler took up Mr. Brockelbank for a passenger flight. Lieut. Minchin then took charge of the machine and, with Fowler up behind, made a very good flight. On coming down Fowler sent him up for his first solo, which, after completing two circuits in good style, he spoilt by pancaking from about 6 ft. Luck, however, was with him, as he only broke a couple of struts and slightly damaged the propeller.

Sunday was fine but no one turned up. Monday was also fine and a considerable amount of work was got through. Fowler started with a test-flight on the Bristol. Lieut. Minchin then made three solos, flying very steadily and landing well in spite of quite a fair breeze. Mr. Thompson was also out and made two very good circuits. During the latter part of the afternoon Lieut. Brown, R.N., and Second-Lieut. Lerwill, R.F.C., both put up some fine flights in a rising wind.

### London Aerodrome, Collindale Avenue, Hendon.

**Grahame-White School.**—Wednesday, last week, Mr. Manton out early testing No. 5 machine and making a trip round the aerodrome to arouse the pupils living near by. Mr. C. Lan-Davis rolling. Mr. Cheeseman doing circuits and straights on No. 5, with Mr. Power as passenger, and the other pupils in evidence until the ground was cleared for *brevet* tests.

Thursday it was very blowy all day, but Mr. Manton out in the morning on No. 6 machine with pupil passengers. Desoutter was flying on monoplane.

**Aircraft Co. School.**—Verrier out testing Maurice Farman Monday last week, flying for an hour over the surrounding country. Later he again went out, but had to descend owing to engine trouble.

On Tuesday he was carrying passengers during the afternoon on the same machine. Next day Verrier, accompanied by Mr. H. Barber, flew to Farnborough, his time being 35 minutes. He was obliged to make for Brooklands owing to thick fog in the neighbourhood of Staines. On sighting Brooklands he made straight for Farnborough, where he passed the necessary tests required by the Aircraft Factory.

**Blackburn School.**—After a test flight of 10 minutes by Mr. H. Blackburn, Sunday morning last week, Mr. Buss took machine and flew circuits and figures of eight for 15 minutes, followed by Dr. Christie, practising straight flights for 35 minutes, and



Mr. Foggin a 13 minutes' flight. Mr. Buss handles machine in first-class style, and is quite ready for his *brevet* tests. Wind and rain prevented any schoolwork Monday and Tuesday, but Wednesday, school was out at 8.30 in charge of Mr. H. Blackburn, who, after a test flight of a few minutes on the rolling machine, sent Mr. Glew to try a figure eight for the first time, which evolution was satisfactorily carried out. Then Messrs. Buss and Glew proceeded to fly their tests for *brevet* and got through in perfect style, Mr. Buss flying excellently as also did Mr. Glew, who used such good judgment in his landings that he brought the machine to rest in both trials dead on the mark. After this another test flight by Mr. Blackburn, followed by 30 minutes' practice in straights and turns by Mr. Laurence Spink, and 30 minutes' rolling practice by Mr. Morris. It reflects great credit that such a good morning's work can be got through with the worst machine in the Blackburn stud.

**Blériot School.**—A good day's work was put in by the pupils Wednesday, last week. In the morning M. Gandillon was on No. 3, and Messrs. Teulade, R. Desoutter, and Clappen were doing good straights on LB2. M. R. Desoutter has made excellent progress during his tuition, and should do very well later on as a pilot. In the afternoon MM. Teulade and Gandillon had No. 3 to themselves, and taking turns, were practising landings for their *brevets* from 50 and 100 ft., landing well on the mark. M. Teulade did a very good circuit at 100 ft., handling the machine very well indeed, as also did M. Gandillon at about 60 ft. These two pupils are now only awaiting the advent of another fine day to secure their tickets.

On Sunday Mr. Gustav W. Hamel came down to the aerodrome and executed some beautiful flights, going up twice for a few minutes on Mr. Weir's Blériot.

**British Deperdussin School.**—Wednesday last week in the morning, Mr. Scott passed his *brevet* tests in excellent style, attaining a height of 250 ft., and landing well, first time within 15 ft. and second time within 30 ft. of observers. After which Lieut. Hordern put in some splendid work for nearly two hours. Considering how little practice Lieut. Hordern has had, he has made rapid progress, and shows great promise. Fog came on later and stopped further work.

Blowing a gale Thursday and Friday, so no school work.

Saturday, No. 4 *brevet* machine tested by Mr. Brock, who flew several circuits, then handed over to Mr. Valazzi, who after flying several straights went for his first circuit; quite good work. Mr. Valazzi has come on very well lately, and will soon be ready for his *brevet*. Lieut. Hawker put in some useful work on No. 3 *brevet* machine, flying straights and landing in good style. His military duties prevent this pupil putting in as much work as he would wish.

Thick fog all day Monday, and Tuesday fog and wind too much for school work.

**W. H. Ewen School.**—The pupils at the school were able to get in some useful practice during the past week. The weather was not satisfactory for outdoor work until Wednesday, but on that day from 8.15 in the morning until dusk the pupils were out flying, making capital progress under the instruction of Mr. Lewis Turner and M. Baumann. Messrs. E. T. Prosser, J. H. Torr, and A. W. Jones were out in turn on monoplane No. 1, and by the end of the day were handling the machine well and doing straights in a confident manner, which augurs well for their future. After a test flight on the 35-h.p. Caudron by the chief pilot of the school, Mr. Lawford took up the machine for several circuits, flying splendidly and landing well. Lieut. M. W. Noel on the same machine put up some good straight flights, flying very steadily, while Messrs. R. S. McGregor and M. Zubiaga were getting off with every confidence. Messrs. H. H. James and J. H. James, who are now on the staff, also put up some good flying on the 35. The latter, it will be remembered, recently won the £100 prize, offered by the I.C.S., putting up a fine exhibition on the 35-h.p. Caudron. Mr. H. Stewart, the latest pupil at the school, had his first rolling practice, and made a very creditable start.

Thursday and Friday were drawn blank as far as outdoor practice was concerned, but Mr. Lewis Turner was lecturing to the pupils in the hangars on the construction and regulation of the machines and engines.

On Saturday the school machines were out shortly after 8 a.m. After a flight on the 35-h.p. Caudron biplane by the chief pilot at the school the machine was handed over to Lieut. Bayly and Mr. M. Zubiaga, who each made a number of excellent straight flights with good landings. M. Baumann was getting good results from his pupils on monoplane No. 2, Messrs. H. Stewart and A. W. Jones making some good straights. During the afternoon Mr. Lewis W. F. Turner put up some capital exhibitions on the 60-h.p. two-seater Caudron and was also busy carrying passengers till dark, taking up, among others, Commander Schwann, for a trip over the surrounding country.

On Sunday the 26th, the school was at work at 9.20 a.m., and

some good practice was put in. Under the instruction of Mr. Lewis Turner and M. Baumann, Messrs. H. Stewart, J. H. Torr, and E. T. Prosser were doing good straights on monoplane No. 2. Lieut. M. W. Noel and Mr. Lawford were doing some very fine flying on the 35 Caudron. During the afternoon Mr. Lewis Turner on the 60-h.p. Caudron two-seater, and M. E. Baumann on the 35 Caudron put up some splendid exhibition flights.

#### Salisbury Plain.

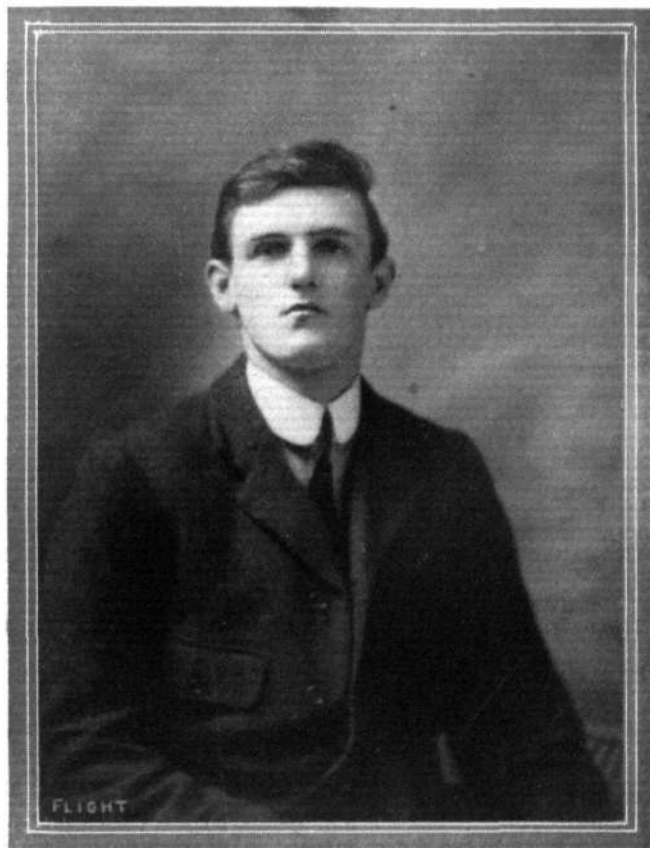
**Bristol School.**—Inadvertently an injustice was done to some of the very earnest officers and others who are working so well for proficiency at the schools, by the omission of the progress made on January 13th and 14th last, by reason of a confusion in the Notes of the Week. On January 13th, Lieuts. Bigsworth and Bowhill both successfully passed the tests for their *brevets* in really fine style, under the observance of Major Brooke-Popham and Prince Cantacuzene. Busteed and Jullerot had earlier gone for a flight to Lymington and back in an 80-h.p. Bristol monoplane. Prince Cantacuzene was out on this day for a flight on a 80-h.p. machine, landing after a trip lasting fully half-an-hour. England took Mr. Tod for tuition in the side-by-side monoplane, Prince Cantacuzene going out for another flight in an 80-h.p. monoplane, remaining aloft for 20 minutes. Busteed, England, and Jullerot all tested weather and found too bad for further work.

On January 14th Lieut. Marix was out as soon as fog had cleared for two good solos on biplane, whilst in the afternoon this pupil successfully passed the tests for his certificate. Lieut. Vaughan passed the tests for the first part of his ticket, both flights being very creditable as the weather was anything but favourable.

No flying Monday last week, wind and rain prevailing all day. High wind all day Tuesday rendered flying impossible again.

On Wednesday it was much too misty for school work, but Jullerot was out for a trial of a tandem monoplane, making a flight lasting 50 mins., whilst England for 30 mins., and Harrison 10 mins., were both out for solos. Jullerot made a trial later in a single-seater monoplane, whilst England was up in a biplane, but mist in the morning and rain in the afternoon prevented any serious work being done.

Wind was very strong all day Thursday, and no flying was possible. Work was confined to the hangars on the erection of



Mr. Montague F. Glew, who last week, on the 50-h.p. Gnome-Blackburn monoplane, secured his Royal Aero Club certificate at the Blackburn School, Hendon Aerodrome. Mr. Glew got through his tuition without a breakage, and during the *brevet* test landed dead on the mark after each test.

new machines just received from the works at Filton. Friday was very windy, and flying was impossible all day.

Jullerot was first out on Saturday for a trial of the conditions and found too bad for pupils. England was on a 50-h.p. monoplane for 15 mins., afterwards giving a pupil tuition in biplane. Mr. Smith-Barry was out for a fine solo, flying right over the Plain, landing after half an hour's flight. Mr. Dacre made a flight in a biplane, and Harrison took Mr. Tower for a long tuition trip. Jullerot was afterwards out for his first flight in one of the 80-h.p. Bristol monoplanes, as also was England, and both made really good flights. Jullerot was out later on for a flight in a Bristol tractor biplane, his first, and made a good trip.

**Royal Flying Corps.**—Owing to the unsettled weather there is practically nothing to record for the past week. The only machine which has been out is the factory-built biplane 203. In consequence of one of the machines catching fire at Farnborough, no flying is to be done on Maurice Farmans until further orders. Work on new sheds which are being erected near Netheravon is being pushed on rapidly, and the buildings are to be completed next month.

## South Farnborough.

**Royal Flying Corps.**—The arrangements for No. 2 Squadron of the Royal Flying Corps to occupy the new base at Montrose in Forfarshire, Scotland, have been held in abeyance for the past few days. The squadron was to have moved last week, but for various sound reasons the movement has been postponed until this week. As far as possible the various flights, composing the squadron, have each adhered to one particular type of machine, and the squadron possessed a flight of Maurice Farmans, a flight of Breguets, and a flight of the B E type of machine. The Breguets, however, have been handed over to No. 4 Squadron, and only the Maurice Farmans and B E machines will make the long journey by air to the North. Nothing of the sensational will be attempted in the flight to Montrose. Non-stop runs or time records will not be aimed at, for the pilots, weather permitting, will proceed with the object of accomplishing the journey as safely as possible, and as speedily as possible. Certain places indicated in orders will be called at on the way to replenish petrol and oil. The road party, proceeding in motors, will carry mechanics, tools and spares, in case they are needed in event of breakdown. A party of the Royal Flying Corps, belonging to No. 2 Squadron left Farnborough *en route* by train for Montrose on Monday evening. Monday indeed was a busy day for the men of the squadron, as all the equipment of stores, tools, spares, clothing, &c., were loaded on trucks at South Farnborough sidings for rapid despatch to the new quarters. Under the able superintendence of Sergt.-Major Fletcher the work was speedily carried out in a workman-like manner. Sergt.-Major Fletcher has the welfare of the squadron thoroughly at heart, and was here, there and everywhere directing the various detachments. The main body is expected to move this week-end and will no doubt do so, as all the stores, &c., have been despatched.

Wednesday, January 22nd saw some fine flying in the district. The morning opened fine with a touch of hard frost in the air, and the weather being calm was ideal from a flying standpoint. No. 4 Squadron put in some good work with the Breguets, and the performances were of a similar nature to those of previous weeks. About dinner time a new Maurice Farman was brought over by Verrier from Hendon, and was afterwards sighted at a considerable height, about 6,500 ft. right over the Marlborough Lines. The small Caudron biplane with a 50-h.p. Gnome, and fitted with a Henry Farman type of undercarriage, made a fine flight in the hands of one of the Caudron brothers, who afterwards took up a passenger. In appearance it is a pretty and compact little machine, with planes of a light blue colour, and its behaviour in the hands of M. Caudron was all that could be desired. The new war plane, described in these notes

in a previous issue of FLIGHT also made several flights. The radiators of the water-cooled Chenu engine has been removed from the blunt nose of the short fuselage and are placed in a vertical position, grid fashion, further behind. They should certainly be more efficient thus arranged. Col. Cody also gave the public a fine display during the day, and flew at a good height. He passed over the Blenheim Barracks at an altitude of about 1,000 ft., his engine running well. Out on Farnborough Common, Cody demonstrated the handiness of his machine when on the ground, and did some tricky manoeuvring. He can practically keep the machine turning in its own length, and at one time seemed to turn it round like a top. One could easily note the advantage of having the wing tips fitted with small wheels, when turning or rolling.

Thursday was a bad day for flying. The morning opened with heavy gusts from the south-west, which increased in frequency during the day. It was anything but a good day, and when the roar of an engine and propeller could be plainly heard, one naturally concluded at first that tests were being carried out at the Royal Aircraft Factory, as one little thought anyone would be venturesome enough to fly under such extremely trying conditions. However, it turned out to be De Haviland on BE 2 machine, and the exhibition, as a piece of rough weather fighting, was well worth going a considerable distance to see. Serjt. Hunter, of No. 4 Squadron, did some fine flying during the end of the week, and is certainly a very promising pilot, capable of handling the machines in bumpy weather, and this with a heavy load of fuel on board, as well as a passenger. Serjt. Hunter passed his tests last week-end with every credit, and fully deserves his pilot's badge. There were several machines being tested on Monday from the Royal Aircraft Factory, but the flying was of the usual order, some fine flights being put up by De Haviland. A new pilot for the Factory was also out several times. Cody made a fine flight over Farnborough late in the afternoon, and was swinging along at a good height. No. 1, the Airship Squadron, are justly proud of the fine performances of "Gamma" on January 22nd, and the Naval members of the Corps are to be congratulated on their skilful handling of the airship. A party who are at present undergoing courses of instruction in the handling of aircraft at the Balloon Sheds, South Farnborough, made a splendid cruise during the middle of the day, as far as London and back. After some manoeuvring over the district during the morning, the "Gamma" was headed for London, the voyage occupying about four hours there and back. Commander Masterman, R.N., Chief of the Naval Wing, was in command; Lieut. Husband acted in the capacity of pilot, while Lieut. Woodcock had charge of the engines. Ascending in a very hazy atmosphere from Farnborough Common she disappeared from sight in a north-easterly direction. Somewhere about 3.15 p.m. she was again sighted returning from the north, and after being cleverly handled above Farnborough Common was safely housed in the big dirigible shed, being taken in under cover of the huge sail-cloth wind screen which protects the entrance of the shed from the wind. Although the journey to London was made at no great altitude it was most interesting and successful, and owing to the hazy atmosphere and low-lying clouds the courses were set and steered by compass. Crossing the Thames at Hampton Court, on arriving over Fulham and Chelsea, the "Gamma" was headed back home, as the weather was by this time beginning to look somewhat threatening, and about four o'clock it commenced to snow, by which time, however, the "Gamma" had been successfully grounded and docked. Some fine manoeuvring also took place round the district on Monday and Tuesday this week, particularly on Tuesday as it was foggy up above, and the "Gamma" could be more often heard than seen, which gave a somewhat weird effect. At times during the morning one could see her slipping along at a low altitude like a grey shadow, only to vanish away quickly in the mist. The conditions up above were such that steering could only be done by map and compass.

## Changes in Field Service Regulations.

MANY alterations, directly due to the introduction of aircraft and the work of the Royal Flying Corps, are contained in the new "Field Service Regulations." A new chapter in the manual deals fully with the Air Service in regard to reconnaissance and the gaining of information, and the principles of aerial work are also specially dealt with. It is laid down that aircraft at an altitude of 5,000 to 6,000 ft. can detect, in good weather conditions, troops about six miles distant. Special reference is made to the vulnerability of aircraft against hostile fire, and it is considered that howitzers are most dangerous to dirigibles when the latter are at or under 4,500 ft. in altitude, while rifle fire is considered dangerous when at altitude of about 3,500 ft. Field artillery, it is mentioned, will not be effective against aeroplanes moving at a height of 4,000 to 5,000 ft., while it is considered that they are secure from

damage against rifle fire when flying at about 3,000 ft. above the earth.

Aircraft pilots are advised to use low lying clouds for concealment when approaching an enemy. A pilot, on obtaining the desired information, is to transmit it by wireless, or other suitable means of communication to headquarters. Troops are also advised not to reveal their positions by opening fire on aircraft, without reasonable promise of result, as it is difficult to observe troops from above, if they lie quite still even in the open. Hedge cover or improvised cover in the open is recommended as a means of escaping observation by aircraft. An obvious inference from the paragraphs on aircraft, is that night operations will in future be frequently used as a foil to observation by air scouts, so that warfare in the future, will undergo still greater changes, in consequence of the use of aircraft as fighting units.



## HYDRO-AEROPLANES.

BY V. E. JOHNSON, M.A.

(Continued from page 99.)

## A Comparison of the Different Float Systems.

AT the Monaco meeting the single float Curtiss type system probably proved itself the best. It must be remembered, however, that the Curtiss machine was a very light one; and one which attains a high speed when running awash and "unsticks" (*decolles*) very easily. At rest, *i.e.*, when floating on calm water, the machine leans to one side or the other according to the distribution of weight on it (see Fig. 10), one or another of the balancers being thus called upon to support some weight in consequence. Once the machine has any way on it, the lifting effect of the planes and the movement naturally combine to steady the machine so that it sometimes ran for quite a distance without dipping either balancer into the water. The Henry Farman biplane began with three floats, one aft under the tail and two under the main planes, but discarded the former towards the close of the meeting. The Maurice Farman was much improved when the aft float was removed and the forward floats brought closer together; but it must not be forgotten that their longitudinal flotation stability was much lessened in consequence. The Sanchez-Besa was at first unmanageable owing to her floats being placed very widely apart; being quite out of control when landing in consequence. If the machine was canted the least bit to one side when she struck the water, she pivoted on the more immersed float, and in spite of any amount of helm the machine swung sharply round; it was greatly improved when the floats were shifted forward a little and also brought nearer together. In order to have good

or lowered to the extent of at least three feet, either independently or together at the will of the pilot.

In order to make any float skim over the surface of the water, it is evidently a great advantage to have as little bulk beneath the surface as possible; it is also important that the float should commence to raise itself out of the water at a low speed, say 8 m.p.h., and as the speed increases skim or glide over the surface with the least possible resistance. It is also evident that this skimming should be as steady as possible both laterally as well as longitudinally. Increasing the number of floats helps to steady the machine, but greatly increases frictional resistance while in the water and head resistance whilst flying. Placing the floats as far apart as constructional possibilities permit also steadies the machine on calm waters, but under certain conditions undoubtedly has the opposite effect on rough. The lower the centre of propulsion (always supposed above the water) the easier can the machine be made to hydroplane, since there is less necessity to counteract the "nose-digging" effect of the propeller thrust. I have already stated that the speed at which skimming commences increases with the float length; this, however true it may be so far as the hydroplane principle is concerned, can be much modified by the lift of the aeroplane surfaces. Also if the floats be made too short the formation of large waves is assisted which permit of the after part of the float to fall and greatly increase the angle of the planes, thus making it more difficult for the float to rise to the surface and

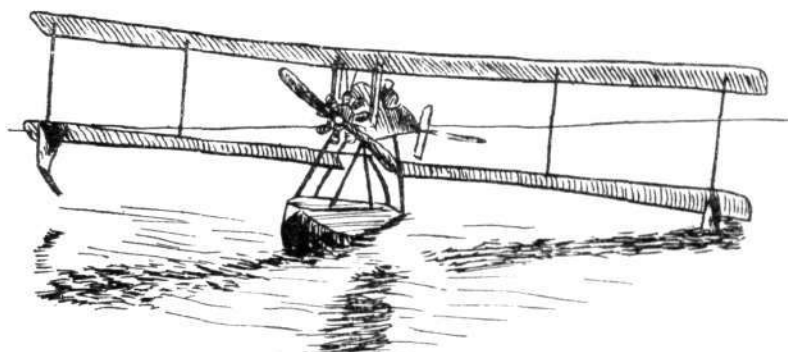


Fig. 10.

Fig. 10.—Showing how a machine with only one central float leans to one side or the other owing to weight distribution, &c. Fig. 11.—Lateral oscillations produced by the waves on a machine whose floats are some distance apart.

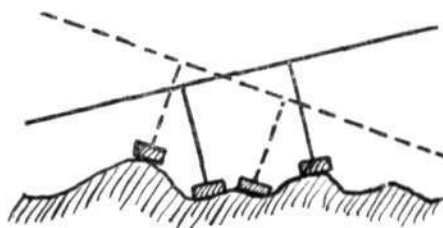


Fig. 11.

stability whilst hydroplaning over the surface of the water and to prevent the machine being upset by a gust of wind, one is led into putting the floats as far apart as possible. This is all right in tranquil waters, such as rivers and small lakes, but on the sea the further the floats are apart there is always the chance of one being on the top of a wave whilst the other is in a hollow (see Fig. 11), and *vice versa*. This may and does produce great concussions, which are very damaging to the solidity of the machine. It is therefore advantageous in this respect to bring the floats closer together, thus arriving at a design having a single central float or two floats fairly close together. By so doing you have, of course, greatly reduced your lateral flotation stability. In the case of rivers and small lakes where the waves are, comparatively speaking, insignificant, any recognised method can really be adopted with success.

Another important factor is the plan form of the floats, according to the state of the water, calm or rough, on which the machine has to carry out its evolutions.

Short floats enable a quicker "get off," but on the other hand, receive more violent shocks from the waves, necessitating the placing of some sort of spring or buffer between them and the machine.

Long floats do not receive such violent shocks when cutting through the waves, especially if pointed in front. We thus see that the chief distinction between machines destined for rough waters and those for rough seas, is that the first can with possible advantage be provided with short floats rather far apart, whilst the second should have long floats closer together, or a single central one. The great difficulty being that in rough water you want good flotation stability both laterally and longitudinally, which (laterally) is exactly what this system does not give you, unless wing tip floats of considerable flotation capacity are fitted on the machine, these latter should undoubtedly be capable of being raised

skim. To overcome these the weight must be reduced to a minimum; but sufficient, not to say ample, flotation must be provided; in my opinion, not less than *twice* that of the total weight of the machine. And if one large central float be used, this float should be divided into at least several watertight compartments. Boat-formed hydro-aeroplanes have less resistance at moderate speeds, 15-20 m.p.h., than those of the old Curtiss type; in the last named the resistance increases very rapidly at first with increase in velocity, provided of course the float be not hydroplaning or skimming; but, if owing either to increased lifting surface or increased speed skimming has commenced, then the resistance rises very slowly, in the case of the hydroplane proper only increasing at a slightly faster rate than the speed.

Froude established (in the case of hydroplanes) that the angle of the plane to the lines of motion should be such that resistance due to surface friction should equal the resistance due to gravity, *i.e.*, in other words the horizontal component necessary to balance the weight of the vessel inclined at the same angle as the supporting surface. Now this inclination is about 1 in 17, so that the total resistance amounts to approximately one-eighth of the weight or displacement of the float.

This resistance varies, however, with the value of the surface friction, which again varies with the kind of surface and still more with the length of rubbing surface. The angle of inclination is not therefore constant, still a one-eighth basis serves as a very fair guide in all preliminary experiments. The stepped hydroplane has proved itself the most successful in actual practice.

## Float Construction.

The French floats are generally constructed as follows: the floats or fuselage hulls always consist of a framework of wood covered with thick veneer wood, *i.e.*, ply wood; this veneer wood consists of 3 layers

of wood with the grain of one layer running crosswise to that of the others, thereby combining maximum strength and minimum weight, and also very largely preventing warping when wet; the wood is also specially treated to prevent this. When 2-ply wood is used the grain is crossed and it has between them a strong watertight cloth which ensures the float being watertight. The separate layers in both cases are kept together by numerous copper rivets; when 3-ply wood is used, two layers of waterproof cloth are used instead of one. The wood generally employed is mahogany, although cedar wood is also used. Sometimes only the bottom and sides of the floats are covered with wood, the top being covered with a strong watertight cloth, as in the case of the Fabre and R.E.P. floats. The total thickness of the wood for the bottom and sides of the floats rarely exceeds 6 millimetres, which permits of a certain elasticity. The edges of the floats are almost invariably metal bound. Generally speaking the attachment to the chassis is rigid, *i.e.*, without spring or buffer.

In the Paulhan-Curtiss float the interior is divided into various compartments in order to give it great rigidity. The Donnet-Lévéque central float or hull is divided into twelve watertight compartments. The three floats of the Albatross (the most successful German production) are constructed of multi-ply wood and are very strong. They are stated to have passed quite unscathed through the heavy surf which was present at the Heiligendamm meeting. Dr. Barton floats were constructed of a light skeleton framework of white wood, the sides and bottoms of which were covered with three layers of mahogany veneer arranged crossgrain. The whole float was then covered with canvas and varnished, a very strong and light float being the result.

The large Fabre float fitted to the R.E.P. at the Paris Salon was not provided with any transverse struts to support the 5 mm. thick 3-ply wood with which the bottom was covered, in order not to interfere with their flexibility and to allow them to give to a certain extent under the action of the waves, especially when landing. In addition to this the float was flexibly suspended. In the Nieuport, cypress wood was used for the main float. In the single one-stepped Wakefield float, the bottom of the float is covered with aluminium, the sides with duralumin and the top with Willesden canvas. Air sacks mounted on spring boards form the "balancers." This float, unlike the Fabre, is built on a latticed skeleton framework of silver spruce, having three longitudinal bulkheads, a practice adopted by more than one other designer, some of whom divide their floats, into a series of watertight departments fore and aft, as well as laterally, a decided advantage in case of a partial smash.

### Dimensional Relations, &c.

In the Paulhan-Curtiss Triad the length of the central float was 15'7 ft. and its weight 125 lbs. Dr. Barton's pontoons were 20 ft. long, 10 ins. wide, 4 ins. deep, weight 26 lbs.

The central Fabre float on the R.E.P., which took part in the St. Malo contest, had a length of 7'5 ft. and a breadth of 6'5 ft.

The central float originally fitted by the Lakes Co. on the Water Hen was a three-step hydroplane, 12 ft. long, 2 ft. wide, average depth 1 ft. The present one-step float (taking our dimensions from the scale drawings given in FLIGHT, December 7th) is 12 ft. long, 6 ft. wide, and has an average depth of 7 to 8 ins. In an earlier Curtiss than the one mentioned above, the central pontoon was 8 ft. long, 28 ins. wide and 9 ins. deep; a still earlier one, 12 ft. long, 2 ft. wide, 1 ft. deep, its weight was 50 lbs., the bottom curving upwards 3 ft. from the leading edge and the top downwards 3 ft. from the rear edge.

The twin catamaran floats of the Sanchez-Besa measured 18 ft. in length, 2 ft. in width and they had a depth of 1 ft. 4 ins. The Borel\* floats (similar type) were 11 ft. 6 ins. long, 1 ft. 7 ins. wide and 1 ft. in depth, there was also a tail float 4 ft. 7 ins. in length,

\* Won Tamise meeting.

In the new Curtiss hydro-aeroplane (air-boat type), the hull or central float is 26 ft. long, 3 ft. wide and has a maximum depth of 3 ft. Like the Donnet-Lévéque there is a joggle or step. The large Fabre float fitted to the R.E.P. at the Paris Salon was 10 ft. wide and 8 ft. in length. In the Catamaran type of floats shown at the Paris Salon the length varied from about four to seven times the breadth and the breadth was about four times the depth.

The width of the lateral flotation base was about one-third the maximum span, and in the case of tractors the plane in which the propeller revolved cut the floats at a distance from prow to stern equal to one-third the length of the float. In the Astra this plane, however, nearly cut the leading edge of the floats; the flotation base was nearly one half the span, the length of the floats being about three times their breadth. The Nieuport floats are slightly tapered towards the front and rounded off, and to this "nose" are attached two fins about 1 ft. long, 6 ins. deep and set at an angle of 45°. They are said to be designed for a double purpose, to prevent the floats burying their noses in a heavy sea and to shield the propeller from the wave or spout of water so often thrown up by the prow of a float.

### The Attachment of the Floats to the Machine.

In the case when the principal float also forms the fuselage, as in the Donnet-Lévéque, Curtiss, &c., type, the problem presents no especial difficulty. In other cases some considerable difference of opinion seems to exist. There is of course the question of rigid or flexible attachment; at the Paris Salon only one had adopted the latter method, *viz.*, the R.E.P. In the Wakefield the suspension of the machine is also flexible, but this method is not common. In almost every case the method of support is steel compression struts, held rigid by wire bracing; generally speaking these struts are attached directly to the fuselage or main body of the machine, but in some cases they are attached to the wings, as in the Caudron, Farman, Albatross, &c.; this is, however, largely due to the difference in type, the latter not being properly speaking provided with such.

### Combined Floats and Landing Chassis.

The best type is undoubtedly that in which the wheels can be drawn up out of the water, as in the Donnet-Lévéque, Curtiss, Albatross, Aviatik, &c. In the latest type of Curtiss boat, fitted with a new type of folding landing gear,

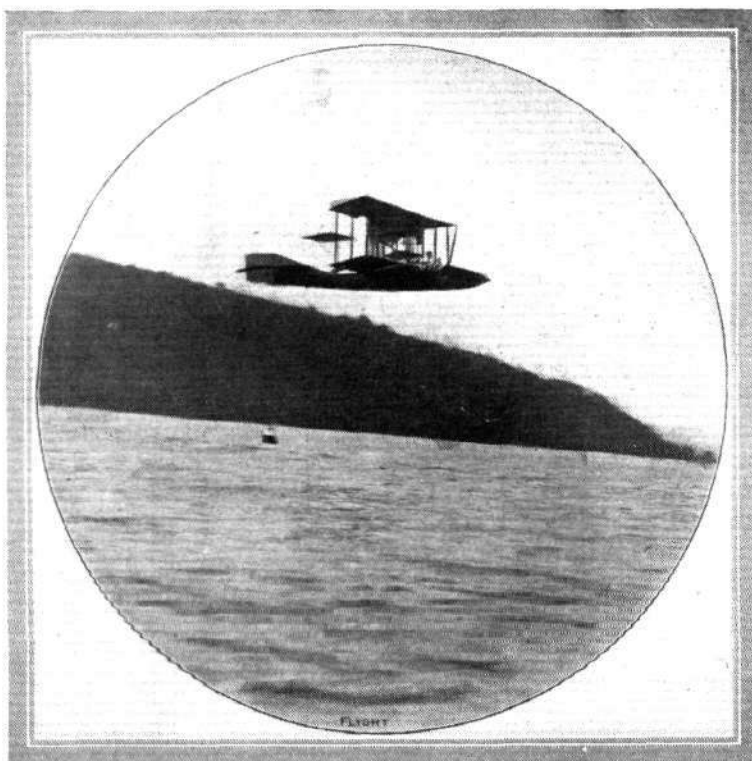
it experienced no difficulty in starting from the land and alighting on the water at a speed of about 50 m.p.h. Just before reaching the land the wheels were lowered and the machine rolled up on to the shore just as easily as if it had been a land machine. Other machines have also done the same, and under very favourable circumstances could no doubt alight straight away on land, but the machine which can indifferently alight either on land and water or even start from, say, a ploughed field, is not yet, so far as I know, in existence.

### The Conditions which Hydro-Aeroplane Floats should Fulfil.

These are:—

1. The greatest permissible flotation capacity.
2. Minimum water and air resistance.
3. Quick rising from the surface of the water.
4. Minimum weight combined with maximum strength.
5. A non-tendency to dive.
6. Absolute watertightness.
7. A capacity to withstand (if necessary) severe shocks from the waves and also landing on *terra firma* without damage.
8. Support (at least) their own weight in the air (if possible), *i.e.*, be efficient as aeroplane surfaces as well as floats and hydroplanes.

A set of conditions which are likely to test the skill and ingenuity of both the designer and builder to the utmost.



Curtiss's flying boat in flight after leaving the water.



### The Aeroplane on Floats v. The Air Boat.

As to which particular type the hydro-aeroplane of the future is to belong is a matter on which it is at present extremely difficult to express an opinion; both the above mentioned types have shown themselves successful under favourable conditions and on comparatively speaking smooth water; both have failed under adverse conditions, and on really rough water; there are those, of course, who maintain that the hydro-aeroplane will never succeed on rough water; leaving other considerations out of account, this is a matter, however, which depends very much on the *size* of the machine, for the simple reason that, so far as the actual roughness of the water is concerned, conditions which may most certainly be considered rough for a small machine cease to be so for a machine of, say, ten times the size. That type which can be the best adapted for machines of large size will in all probability be the successful one, and here many consider that the air-boat stands the better chance, since certain circumstances (such as rolling, &c.), which now affect it

adversely would be much less pronounced in a vessel of a larger size. There certainly appears, however, to be a future (in naval affairs at any rate) for a small, compact and very swift machine, capable of rising and alighting on the water at a very high rate of speed—say 60 to 80 m.p.h.

The machine would probably have to be of the Canard type with one long central float or hull and two balancers—owing to the speed of alighting and travel, hydroplane or flat bottomed floats would in all probability be out of the question—the form of the main float or hull being curved and of streamline form, small auxiliary floats or fins being provided well to the fore, to prevent nose dipping, caused partly by the waves and partly by the enforced high propeller thrust. Since the machine would have to rise from the water owing (practically speaking) entirely to the air lift of its aeroplane surface, it would have to be a biplane preferably of short span in order to have as small a lateral flotation base as possible. The chief reason why I select a Canard instead of a tractor is that the former has less tendency to upset on alighting.

## BRITISH NOTES

### Aeronautics at South Kensington Museum.

THOSE who have not yet visited the interesting collection of apparatus, models, &c., illustrating the application of scientific principles to aeronautics, at the Science Museum, South Kensington, still have an opportunity of doing so, as the Board of Education has decided to keep the exhibition open until the end of February.

### A Memorial to Lieut. Parke.

IN the parish church of Up-Lyme, Dorset, a memorial is to be erected to Lieut. Wilfred Parke, R.N., who was a son of the rector of the parish. Mr. A. J. Woodroffe, J.P., of Ware, Lyme Regis, is honorary treasurer of the fund.

### English Prince in the Air.

WHAT is believed to be the first flight by a British prince was made on the 22nd ult. at Madrid, when Prince Leopold of Battenberg accompanied Mr. Howard Pixton during a 20 minute trip on a 80-h.p. Bristol monoplane. An altitude of 3,500 ft. was reached by the machine, which is one of a number undergoing tests before being handed over to the Spanish Government. The honour of taking the first English royal passenger is one of which the Bristol Co. may well be proud.

### More Breguets for British Army.

AT the same time that the War Office ordered five Avro biplanes a similar number of machines of the latest type were ordered from the British Breguet firm.

### An Aero Show Race Meeting at Hendon.

FOR February 22nd, the concluding day of the Aero Show at Olympia, a special programme is being arranged to take place at the London Aerodrome, Hendon. The chief event will be the first speed contest of the season, and the first prize will be the Aero Show Trophy, value 60 guineas, presented by the proprietors of the London Aerodrome, together with 20 sovs., while the second prize will be 10 sovs. The contest, which is timed for 3 p.m., will be a handicap with two preliminary heats of four laps or six miles, and a final of six laps or nine miles. Entries should be sent in as soon as possible to the Grahame-White Aviation Co.

### Free Accommodation at Hendon.

IN connection with the forthcoming Aero Show at Olympia, the Grahame-White Aviation Co. announce that they are prepared to offer free accommodation at Hendon to those who desire to make trial flights or tests with their machines, both before and during the Show, and as the accommodation is limited it will be necessary for intending competitors to make immediate application in order that this may be reserved.

### A Clever Cody Pilot.

TAKING advantage of the spell of fine weather on Monday the Cody biplane, which won the chief prize in the Military Trials, &c., did quite a large amount of flying at Farnborough. Lieut. Rogers Harrison, to whom it has been entrusted, pilots the machine in the same masterly fashion as its builder.

### An Awkward Predicament.

ONE of the mechanics holding down the "Gamma" after her trip to Portsmouth and back on Monday failed to hear the officer's order to release when another ascent was made and was carried up to a height of 100 ft. Fortunately he held on to the rope while the airship descended as quickly as possible so that he escaped with nothing worse than a shaking.

## OF THE WEEK.

### Mr. Grahame-White Flies over St. Moritz.

UNABLE to resist the temptation, Mr. Claude Grahame-White had one of his biplanes sent down to St. Moritz, where he is enjoying his well-earned holiday, and on Monday he was flying over the town at a height of 2,000 ft.

### The Royal Flying Corps.

THE men attached to the Naval Wing of the Royal Flying Corps have now been supplied with cap-ribbons bearing the legend "Royal Flying Corps." They replace the H.M.S. "Actæon" ribbons, which have been worn hitherto.

### Naval Flight from Eastchurch to Portsmouth.

CONSIDERABLE interest was aroused at Portsmouth on Monday morning by the appearance over the town, about 11 a.m., of a biplane. On landing near the R.M.A. Barracks at Fort Cumberland, the pilot was found to be Lieut. Lushington, who had flown over from the Naval Flying School at Eastchurch.

### A Naval Machine in Sussex.

A SECOND Naval biplane, piloted by H. Bobbett, and carrying a mechanic, Lec, also left Eastchurch for a non-stop flight to Dover and back, but losing his bearings in the fog near Canterbury, the pilot got right off his course and eventually landed at Ninfield close to Hastings. Owing to trouble with the engine through the carburettor freezing, the landing was a somewhat bumpy one, the chassis and planes of the machine being slightly damaged in trying conclusions with a hedge.

### Mr. Hucks at Lincoln.

REMEMBERING the splendid flying put up by Mr. Hucks during his visit in August last, a large crowd gathered on the aviation ground at Nettleham Road, Lincoln, on Wednesday afternoon, and saw some fine flying. Mr. Hucks made two ascents on his Blériot, and in the second, which lasted twenty minutes, he went up fairly high and made a wide circuit over the country. The next day a strong breeze was blowing, but Mr. Hucks went up and made two circuits of the ground. On landing, however, the machine was caught by a gust of wind, carried up and dropped down again so violently that the chassis was slightly damaged.

On Friday evening, Mr. Rowland Ding, who is associated with Mr. Hucks, gave a lecture on aviation at the Technical School before a crowded attendance. He referred to both the theoretical and practical sides of aviation, illustrating his remarks by means of lantern slides, but perhaps the most popular feature of the lecture was the making and flying of little paper models.

### Flyers on the Stage.

FORGETTING their aerial pursuits for a time, a number of aviators and others actively interested in flying, including Messrs. S. F. Cody, T. Sopwith, G. Hamel, R. Charteris, P. Stanley Adams, A. A. D. Lang, E. Sassoon, and others took part in a performance of "Three Little Maids" at Weybridge on the 23rd ult. The leading part was taken by Miss Muriel George. The performance was in aid of the local Cottage Hospital and the proceedings were graced by the presence of the Duchess of Albany.

### British Machines for China.

IN England's shed at the Shoreham Aerodrome, work is progressing very well with the machine which has been ordered by Mr. Wong, a Chinese pupil, and which he will probably take back to China, together with a two-seater machine which he has ordered from the same firm. On the school bus the other day a propeller made by the Avro Co. was tested and gave splendid results.

## EDDIES.

As I sit here at my desk chewing the end of my pen in the hope that I may extract from its choice wood some essence that will tell me some subjects to write about and what to write about them, my mind wanders to the method that I have been told Herbert Spencer, the great English philosopher had of inducing inspiration, by playing a vigorous game of tennis and then settling down with a wet towel round his head to write like fury. Perhaps this same method would not work with me, and in any case, I cannot get tennis at two o'clock in the morning, which happens to be the time now.

To complete my discomfort, it is miserably cold outside, the fire has gone out, and there isn't a cigarette in the place. Inspiration or no inspiration, something must be done.

The other day, while talking to a pilot friend, this same trouble cropped up in the course of conversation. Luckily for him, he has no great need to do much writing, so whatever he has to do in that way he can put off until the spirit moves him. With a journalist it's different. "But," my friend said, "I'll tell you when I do feel like writing." "Stick me on a machine for the best part of a day and then let me have a bath, a good rub down, and a change of clothes, and I'd write you a book."

But that does not help me a great deal.

What a delightful place the Shoreham ground must be in the summer! There you are, right by the seaside, scarcely five minutes' walk from the line of bungalows that run along the shore nearly the whole way from Shoreham to Worthing. Could anything be more ideal than to live in one of those little maisonnettes there, and spend the summer, or at least a part of it, learning to fly.

Think of getting out of it in the early mornings, and cutting across to the ground to go through rolling, then hopping, straight-line flying and circuit practice. As breakfast-time approached you could slip back to the bungalow and have a good swim round before the bacon and eggs were ready. More bathing, and perhaps some boating, during the day, and then more flying practice in the evening. Why, it wouldn't take me long to decide on what to do with my summer if it were not for the unfortunate fact that I've got to keep on writing to keep on living.

There must be lots of sporting young fellows about who, unlike myself, have all the means they are likely to require, and who, I am sure, would come along and learn to fly like a shot if they only knew what good fun they'd get out of it. If they'd like to get by the sea, they could have the choice of Shoreham, Eastbourne and Filey. If they are not particular about the seaside, they could pick between all the up-to-date schools at Brooklands, Hendon and Salisbury Plain. Taking an average, seventy-five guineas is all it would cost them—and it would be very well spent too! Everybody'll be doing it one of these days. They ought to come right along now and learn.

It is, perhaps, not so much the case nowadays as it was two or three years ago. Then, anyone joining the

aviation industry could reckon on having a very entertaining time of it, taking it all round. Were he a pilot, a pupil, or just a mechanic, he enjoyed himself. Naturally, the pilot had the best time of it, for wherever he went he was recognised as being someone vastly out of the ordinary. Anyway, he did the flying, which needed more pluck in those days than it does now, and whatever attentions he received he really deserved. He usually contracted a mild form of writer's cramp, such was the demand for his autograph. And the ladies—well the pilot was and always will be a particular friend of theirs.

The pupil came in for quite a cheery time, for he was looked upon as an exceptionally modern young man, and somewhat as a lesser edition of the pilot himself. His light did not shine so brightly when he was in his tutor's great presence, but nevertheless he was one to be honoured, for one of these days would not he be flying as well? He, too, had occasional autographs to sign, and carried plenty of cigarettes in his case.

The mechanic had rather a different experience, but in his own sphere he came in for a good deal of admiration, for did he not understand all about the "innards" of an aeroplane? His lot was hard work, and plenty of it. But he had the enthusiasm of knowing that he was doing his share to help on a new and most important industry, so he rarely grumbled. He would work all night, throughout the following day, snatch an hour or two's rest, and then be ready again for another all-night's work. His reward came when he saw his employer winning all the best prizes. There was quite a lot of fun for him in answering the questions of the wondering people that gathered round the machine. In their eyes he was a very advanced type of expert.

As for the questions that were put to him, he did not, as a rule, find any great difficulty in answering them. It is perhaps not an item of general knowledge that quite ninety per cent. of the questions put to Grahame-White's mechanics by members of the exclusive Ranelagh Club when he was flying at their grounds, consisted of two interrogations: "Where does the passenger sit?" and "Which end goes first?"

I was chatting the other day to the head of a firm who specialise on supplying high-grade fittings for aeroplanes. More especially the conversation turned to wire-strainers, for my friend had opened the subject by remarking that he had received an order for a certain number of these fittings, the screwed ends of which were required to be made from a special kind of steel which was impossible to work on an "automatic." "It is a most curious thing," he remarked, "that nearly all the strainers I have had tested have, when they have broken, given way, not in the eye, but in the threaded portion of the screw, and invariably," he continued, "it is the screwed end which has the right-hand thread that snaps."

Can anyone explain this?

There is one pilot at Hendon who cannot quite reconcile himself to the general belief that about two-thirds of a wing's total lift is obtained from the top surface, and that the region of greatest suction lies somewhere in the



neighbourhood of the highest point on the top curve. He flies a Blériot, and at one time the fabric on the top of his wings was in a very baggy condition. But no matter whether he flew level or *vol plané*, whether he flew in calm or windy weather, that fabric on the top surface of his wings always sagged down between the ribs in exactly the same fashion as if the machine has been resting undisturbed in the quiet atmosphere of the hangar.

As against this I have heard of a Blériot pilot who, flying his monoplane in a big wind, was struck by such a heavy gust that the fabric on the upper surface lifted out a whole row of tacks.

Further, my Hendon friend is rather mystified as to the state of the air flow over a wing, and he mentions this case. A monoplane that he remembered had remained in its shed quite a long time and, in consequence, the top surface of the wing had collected quite an appreciable amount of dust. One day a pilot took the machine out. When he returned after the flight, there was just as much dust on the top of the wing as when he started. It could not have been that the dust had been trapped there by any fluffiness of the fabric, for the wings of that particular machine had been doped and were quite highly glazed.

Colonel Cody, Ltd., with a capital of £120,000, should be a good thing.

I hear that Mr. Ernest Esdaile, who is organising the "By air to India" scheme, has been adopted as the Progressive candidate for the Norwood Division for the forthcoming London County Council Elections.

A further valuable prize has been offered in connection with the flight to India by His Highness Raj Rana Bakadur of Jhalawar. Already prizes have been offered by Her Highness the Begum of Bhopal and the Maharajahs of Bikaner, Jodhpur, Patiala and Cooch Behar.

Two pupils at one of our well-known flying grounds were sitting over the fire at their diggings having a

heated argument over points bearing on flying in general. The argument turning to flying with hands off the controls, one of them remarked, "Yes, you could do it all right, as long as you didn't attempt it in a *remous*." "Never heard of a machine of that name before," casually replied his friend.

One of the most interesting exhibits at the forthcoming Aero Show at Olympia will be the hydro-biplane that will be shown by Messrs. J. Samuel White and Co., Ltd., the well-known shipbuilding firm of Cowes, Isle of Wight. It will be remembered that they opened, not long since, an aviation department of their works under the control of Mr. Howard T. Wright. In its general arrangement the biplane will bear some resemblance to the Henry Farman water-flying machines that visited many of our seaside resorts last year. In detail, however, the two machines have little in common.

For instance, the main planes of the new Samuel White hydro-biplane are swept back and have negative wing tips furnished with double-acting ailerons. Besides, a new type of cross section is employed which forms the subject matter of a patent that Mr. Howard T. Wright holds. The chief features relating to this special design of aerofoil, are that it has a wide range of speed and that, as has been found from laboratory experiments, its centre of pressure changes its position but very little for wide variations in the angle of incidence of the plane relative to the air flow. Between angles of incidence of three degrees and fifteen degrees, the centre of pressure does not travel more than two per cent. of the chord length.

The machine will be arranged to seat a pilot and an observer, and it will be driven by a Gnome motor of 160 horse-power turning a propeller behind the main planes. Double floats will be employed, of registered design, and each will have three steps. Quite a novel point is that miniature rudders are to be fitted to the ends of the floats in order that the machine may be easily steered over the surface of the water.

"OISEAU BLEU."

## FLYING AT HENDON.

ALTHOUGH there were only four pilots doing active service up at the aerodrome last Saturday, they managed between them to put up over a dozen flights. There was a stiffish wind—about 25 m.p.h.—early in the afternoon, but as the evening advanced it calmed down a bit. A decent number of cars put in an appearance, and they were lined up alongside the first block of hangars instead of inside the enclosures, thus avoiding much of the mud which the recent wet weather has brought very much in evidence.

At about 3.30 p.m. M. D. Manton started off on the Grahame-White 'bus, literally flying out of the hangar, for he started up almost inside the latter. He got off rather quickly and flew very steadily for eight minutes, making some exceedingly sharp turns. Just as he came down, Marcel Desoutter got away on his 50-h.p. Blériot monoplane and gave a five-minute display of "stunt" flying. He made nearly a complete circuit of the aerodrome with both his hands raised above his head. This interesting procedure was brought to an abrupt ending by the engine suddenly petering out just as he was passing over the shilling enclosure. He was able to make a safe landing, however, and at once had the engine seen to. A few minutes after, Lewis Turner came out on the 60-h.p. Anzani-Caudron biplane, and made a short test flight lasting about four minutes.

A. Cheeseman then put up a few circuits on the Grahame-White 'bus; he also went up again on the same machine later in the afternoon. At 4 p.m., Turner started a series of passenger flights

on the 60-h.p. Caudron, making in all about four, and one time going outside the aerodrome. Manton also made several passenger flights on the 'bus. Desoutter's Blériot having been got in flying trim again, he ascended for the second time and remained aloft for nearly half an hour, flying round about at varying altitudes up to 1,500 ft.

On Sunday, which was nice and fine, there was a much larger attendance, and a really splendid display of flying took place. The feature of the afternoon was undoubtedly the thrilling duet by Gustav Hamel—who made a welcome return to Hendon—and Marcel Desoutter on two Blériot monoplanes.

A. Cheeseman, R. T. Gates, and M. D. Manton—who opened the afternoon's proceedings—each made several flights on the Grahame-White 'bus, while M. Baumann was flying the little Caudron biplane in excellent style; Lewis Turner was also out on the Caudron. As previously mentioned, Hamel and Desoutter created quite a sensation by both indulging in all sorts and conditions of "stunts." At times it was impossible to keep in touch with their movements, for while Hamel was doing spirals at one end of the ground, Desoutter would be waltzing at the other. They also took it in turns to "cork-screw" round each other, in fact it was one of the best exhibitions of flying we have seen at Hendon for some time. Hamel gave us a second instalment of his remarkable work later on in the day, so everyone went home entirely satisfied with their afternoon's amusement—or should have done.

# STABILITY DEVICES.

By MERVYN O'GORMAN.

Paper read before the Aeronautical Society on Wednesday, January 29th, 1913, Brig. Gen. D. Henderson, D.S.O., C.B., in the Chair.

1. Devices thus spoken of are for the most part not concerned with stability of aircraft in the strict sense, they mostly pay no heed to the rotational energy stored in the aeroplane's mass, or the oscillation due thereto, or to their decrement, but, still, they strive in a vague way after one of the following :—

- (a) Its safety in the air.
- (b) Its staying truly on its path.
- (c) Its steadiness as a gun-platform or view platform, and as such are worthy of review.

2. These three do not flow from one another, nor does safety follow from stability. Indeed, the three are in some measure mutually exclusive, so we will chiefly dwell on the urgent one—the first—and if needs be, let the others go. The number of such inventions is so large that only a few can be considered in a paper of reasonable length.

3. **The Essential Speed Limits.**—To be in the air at all, "aeros," i.e., aeroplanes, must move through it at a certain minimum speed, and not to break up, they must not go faster than a certain maximum. The upper limit concerns the strength factor of

Aeroplane Competition last August), is so entirely dependent on the engine, that this is not suitable for an automatic device to rely upon as yet.

6. We may conclude :—

(i) That in examining the merits of a device, the omission or provision of a speed maintainer is of grave importance.

(ii) That should the aeroplane give a large range between the slowest gliding speed and the fast flying speed, this adds to safety by moving the danger limits further away from each other.

(iii) That automatic schemes must not avail themselves of this full range, but must needs keep the speed well above any of the tricky limits.

(iv) That if the extreme limit is approached, powerful warp control and light wing loading will be useful.

7. Before going any further with the devices themselves it is useful to glance at the curve, Fig. 1, which gives for an average calm day an indication of one-half of the problem set to us by the wind in this matter, viz., the horizontal air-speed variations measured parallel to the axis of an aeroplane when in flight. In addition to

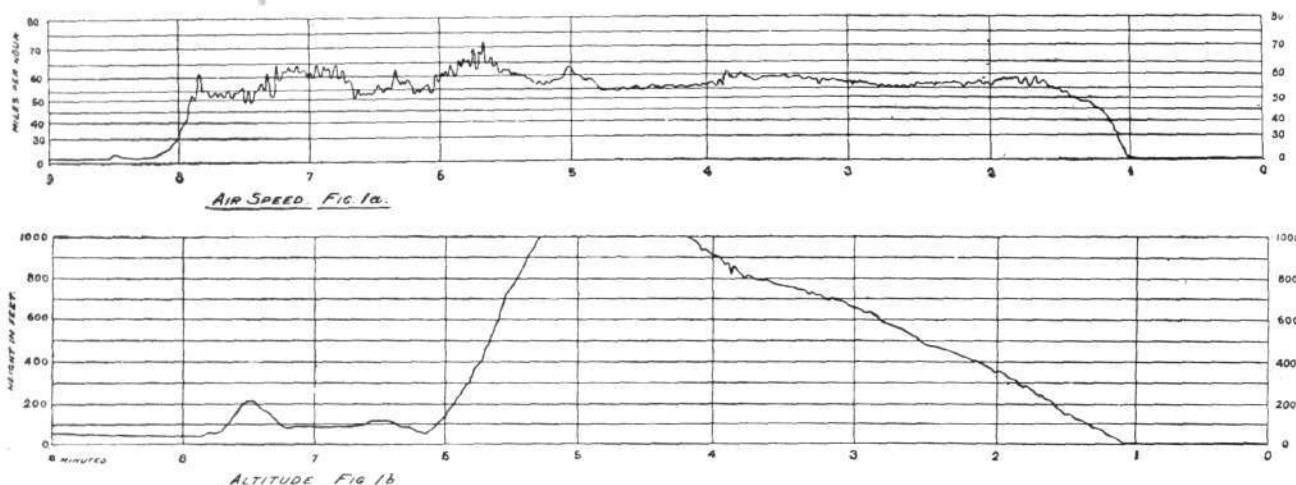


Fig. 1.—Diagram showing the horizontal wind variations, and a certain fraction of the vertical variations, over an aeroplane wing while in flight.

the construction as a rule. As regards the lower limit, no device gives safety to the flyer, unless he is protected from unwittingly reaching such limit. We touch here a cardinal feature at the outset.

4. **The Slowest Speed.**—The minimum safe speed is the speed below which the rudder, elevator, or warp cease to have quick enough control to outvie the gustiness of the air at the time; hence this minimum is not a fixed quantity, but depends at any time on the irregularity of the wind. In any device providing against the undue falling off of speed, engine failure must be reckoned with and hence potential energy from the height and the pull of gravity must be drawn upon by the working scheme of the device. The effort derived from the organs of control falls off as the square of the air speeds past them, therefore the lower limit, which is less low in proportion as the air is more unsteady, is again less low when the engine is stopped. **Twin Propeller Device.**—Accordingly, though some freedom from dependence on gusts is achieved when the propeller stream is made to pass over the wing flaps, as in the "two-propeller" machines of the Wright and Short types, the low limit of slow flying must not be based on the speed with engines turning, but when the engines are stopped. This is the case in all aeroplanes, but is particularly so in these designs, since an appreciable strengthening of the lateral control is probably obtained with them.

5. Slow flying may be rendered more difficult by the inability of particular engines to turn slowly at partial throttle, but with this again we are not now concerned. Moreover, the slow flying which can, with skill, be effected by the process of setting the main wings *cabré*, keeping them there and forcing the aeroplane forward against the very high drag†, so caused (as was done at the Military

\* I have often wished for the liberty to abbreviate the word "aeroplanes" in this way, and since the meaning is not obscured by the shorter term, I trust it, or some other short term, may come into use.

† I adopt "drag," the word suggested by Mr. Archibald Low, in preference to the word "drift," to express the "resistance to forward motion through the

these, and partially expressed in the same diagram, there is the other half, the vertical pulsations which we also have to deal with and cure by sensitive pitching or otherwise. As to the latter I am unacquainted with any published diagrams or measurements. The indications of Fig. 1A even are approximate only, since they were taken at the end of one wing of the aeroplane, and include winds other than axial up to 15° divergence. They probably give a general idea of the extent of variation of the "head-on" velocity at the various heights above the ground indicated in Fig. 1B on the day in question, but we also assume that the size of each air disturbance was large enough to include the whole wing or the whole aeroplane, though we only know of the disturbance over an area the size of a threepenny piece. Experiments are being made as to the size of disturbances at one particular locality, and when these have been made in many places some better generalisation may be possible.

8. **Vertical Gusts and the Shape of Air Disturbances.**—If the vertical gust is a frequent additional disturber of the peace of flyers, and no one has made any show of a reason against this view, it is certain that we must give it more special consideration than it has yet had, and in doing so, observe that an up-current unfortunately results in a forward movement of the centre of lift of a wing curve, which is precisely what we do not want at that moment.

9. A rough pictorial notion of the shape of the air movements should, I think, help the consideration of the effectiveness of devices such as this paper is directed to, and the following, based on a note of Mr. Mallock's, though obvious when stated, is a suggestive way of putting the matter.

air." The word drift is badly wanted in aeronautics in its own time-honoured significance, so that the actual travel of an aircraft may be compounded of the distance which it travels axially, and its *drift*, i.e., the amount it drifts with the wind.



It is common knowledge that :—

- (a) Winds high up are speedy but more uniform ;
  - (b) Gusts, or variations of speed, occur with all winds near the ground ;
  - (c) The stronger the wind, the stronger the gusts, broadly speaking.
10. This state of affairs receives some explanation if compared to the flow of water by the side of a ship. Towards the stern of a

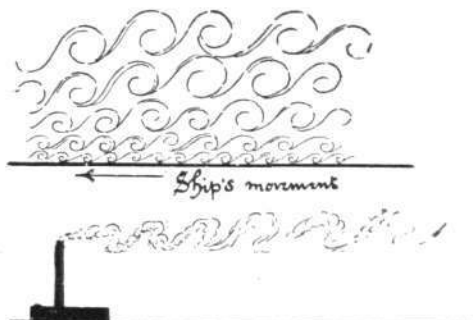


Fig. 2A and 2B.

ship, the water, not only near the ship's side, but also a few feet out, is seen to be in eddies with vertical axes disposed in bands slightly inclined to the ship's side (Fig. 2A). These smaller eddies are near in and are the most violent—the larger are farther out—the speed of rotation diminishing in any region in proportion as it is farther out. The direction of rotation of the eddies is as if they were rolling like wheels on the ship's side. In the air the same thing happens, save

that owing to the greater kinematic viscosity the belts of eddies extend farther, and that owing to the immense extent of the land the phenomenon is aggravated. A tall chimney smoking in a wide and level country gives rise to patterns which correspond very well with eddies having horizontal axes (Fig. 2B). This represents the simplified normal case.

11. Probably the large extent of land mentioned would, in the long run, so retard the air by friction that dwellers in a reasonably level country would nearly always live in a calm, such as normally occurs every night. It is the heat of the day and the different rate of heat absorption, with consequent change of buoyancy between wet and dry nodules of air which I surmise causes a mixing up of the lower or calm levels with the upper windy ones, and thus a short time after dawn we say that the wind rises, whereas the upper winds had never stopped—they are merely beginning to penetrate down to us—putting an end to those quiet hours of flying which we associate with the early morning. It is the equable temperature of the night which allows the skin friction between earth and air to establish a steady state unless the winds above are unusually violent.

12. The upshot of this is that vertical irregularities of air movements are to be expected, not only on high (and perhaps not so much on high with certain exceptions) but close to the ground, and, since an eddy with a horizontal axis involves as much vertical as horizontal disturbance, occur about as freely as horizontal gusts. There is this difference between them to a flyer that, when near the earth, there is no steady vertical wind of which the gustiness is merely a percentage variation. The vertical movement is probably entered into more suddenly and may perhaps be the more difficult to circumvent for this reason. I doubt if anyone can speak positively on this point, but any record of experience would be valuable.

(To be continued.)

## FOREIGN AVIATION NEWS.

### Across the Pyrenees.

WHILE most people were wondering when Bielovucic would attempt to cross the Alps, a young Swiss aviator—Oscar Bider—was quietly training at Pau with the object of flying across the Pyrenees to Madrid. The Pyrenees had been crossed several times, notably by Vedrines, Gibert and Garros in the Paris-Madrid race of 1911, but they had all gone over the eastern side. On the 24th ult., Bider mounted his Blériot monoplane at the Blériot ground at Pont Long, Pau, and at 7.19 a.m. was officially started. After rising to a good height he steered for Arudy and followed the Ossau Valley past Laruns and the peak of Midi d'Ossau, which is about 9,000 ft. high. He then kept the railway in sight past Jaca, Huesca, Saragosa, and then through the Ebre Valley to Catalayna. After nearly 5 hrs. of strenuous flying and finding his petrol supply getting very low, Bider decided to land at Guadalajara, which is about 50 kiloms from Madrid. He was there welcomed by Col. Yives, y Vichy, who has done so much to forward aviation in Spain, and other Spanish officers and after a brief rest of half an hour or so he restarted for the Spanish capital where he landed safely at the Four Winds Aerodrome at 1.30 p.m. The Blériot machine, which was fitted with a 70-h.p. Gnome motor and Regy propeller, behaved splendidly throughout the trip. It is not without interest to note that on January 24th, 1906, Ferdinand Duro accomplished what seven years ago was considered a very noteworthy feat by crossing the Pyrenees in a balloon.

### New World's Speed Records.

ON a Caproni monoplane fitted with an 80-h.p. Gnome motor, Slavorosoff, on Sunday, set up new Italian speed records for pilot and passenger. 100 kiloms. were covered in 57 m. 45 s.; 200 kiloms. in 1 h. 56 m. 30 s.; and 250 kiloms. in 2 h. 24 m. 30 s. These last two figures are world's records, beating Lieut. Biers' times of 2 h. 3 m. 49 s., and 2 h. 39 m. 37 s. respectively.

### New Height Record by Legagneux.

MISS TREHAWKE DAVIES shares the honour with Legagneux of the French passenger record which, although it is 700 metres short of the world's record, is still sufficiently high to satisfy most people. Starting from Issy a few minutes after twelve on Monday, the 80-h.p. Gnome-Morane monoplane climbed very rapidly, and for some time circled over the military ground. Then Legagneux steered his machine in the direction of Versailles, and for over an hour a little black speck circled in the blue sky about Villacoublay, where a landing was made at 10 mins. to two. The machine had been in the air for 1  $\frac{3}{4}$  hours, and the barograph showed that a height of 3,670 metres (12,093 ft.) had been reached. Two bags of shot were carried to make up the weight of Miss Davies to the regulation 70 kilogs. The world's passenger record is 4,360 metres (14,303 ft.), made by Lieut. Blaschke in Austria, while the previous French record was 2,700 metres (8,857 ft.) by Prevost. A Chauvière propeller was used on Legagneux's machine, and it is stated that the machine, which is of 14 metres span climbed 1,000 metres in

7 mins. 30 secs.; 2,000 metres in 22 mins. 30 secs. and 3,000 metres in 45 mins.

### The German Motor Competition.

THE competition for aviation motors has resulted in the German Emperor's prize, valued at £2,500, being awarded to the



The Poster designed for the Aero Exhibition at Olympia from February 14th to 22nd.

Benz motor. Both the Chancellor's prize of £1,500 and the Naval Minister's prize of £500 have been secured by the German Daimler firm, while the War Minister's prize of £1,250 has been won by the N.A.G. motor. The Kaiser has expressed the wish that another motor competition should be organised, the cost to be borne by the National Aviation Fund. What an example for Britain to follow!

## A Brevet for Hydro-Aeroplanes.

AFTER a long discussion at the meeting in Paris on Tuesday, it was decided by the Federation Aeronautique Internationale to institute a special pilot's certificate for hydro-aeroplanes. The conditions are practically the same as for the ordinary *brevets* except that the tests have to be made over water. The F.A.I. also gave a decision in favour of Renaux, regarding his protest against the prize awarded to him at the Tamise meetings, so the list of prize winners will have to be modified accordingly.

## Closed Circuit for Gordon-Bennett Race.

DESPITE the provisional decision at a previous meeting, and the recommendation of a sub-committee in favour of an open course, the F.A.I., on Thursday, decided that the course for the next race for the Gordon-Bennett Race should be a closed one of over a distance of 5 kiloms. (3.1 miles). The total distance will be 200 kiloms., and the race will probably be held in July.

## Death of Charles Nieuport.

AFTER only little more than a year, the Nieuport firm has again lost its chief in very tragic circumstances. Charles Nieuport, who took over the management of the concern after his brother Edward's death in September, 1911, had about that time been practising secretly on a biplane in Egypt, but on his brother's death he turned his attention to the monoplane, and qualified for his certificate at Pau on January 20th, 1912. During last year he carried out many fine flights, and on Friday of last week, in company with Espanet and Gobe, he flew over from Issy to Etampes in order to witness the official tests with some machines built for the French Government. Arrived at Etampes, he decided to test one of the machines himself, and took up his favourite mechanic Guillot. For some time the monoplane flew splendidly, but when descending it suddenly dived from a height of about 250 ft. Both pilot and passenger were instantly killed.

## Long Flights by Guillaux.

A FLIGHT of over an hour's duration was made by Guillaux on his Clement-Bayard monoplane at Issy on the 22nd ult., and a trip of similar duration on Monday included a trip over Paris at a height of 1,500 metres.

## Another British Officer at Rheims.

ONE of the arrivals at the Farman School at Etampes last week was Lieut. Boothby, R.N., who is to put in a short period of practice on Farman machines.

## Vidart Makes a Change.

RENE VIDART, who has been one of the chief pilots of the Deperdussin firm, has now completed arrangements to go into partnership with F. Durafour, and establish a business at Lyons. There the firm will represent Fiat motor cars, Indian motor cycles, and, of course, Deperdussin monoplanes.

## Good Work on Borels.

LIEUTS. LE REVEREND and QUILLIEN were flying for over an hour on their Borel monoplanes over the country in the direction of Rambouillet on the 24th ult., while Bouchez was flying over the aerodrome at Buc for three-quarters of an hour at a height of 1,000 metres. On Saturday, Non.-Com. officers Pinsard and Clamadieu each made trials of an hour's duration.

## A Dep. Presented to French Army.

A MILITARY Commission visited Rheims on Saturday last to witness tests with a 50-h.p. Deperdussin, which is being presented to the French Army by the tradesmen of the XV *arrondissement*. Although the weather was bad the machine, in charge of Janoir, behaved splendidly.

## Testing Farman Machines.

Two military-type M. Farman biplanes were tested by the Marquis de Larenty Tholozan and Maurice Farman, on Monday, in the presence of some French army officers. A third machine, built for Italy, was tested by Fourny. With a load of 400 kilogs. it rose to 300 metres, and flew for an hour and a half.

## Fine Flying on Hanriots.

ON Monday, Faure and Raulet, each on a 50-h.p. military-type Hanriot monoplane, were flying for an hour over Rheims at a height of 1,500 metres. In the evening they again made long flights, one on a 45-h.p. Anzani-Hanriot and the other on a Rossel-Peugeot-Hanriot.

## Deperdussin Hydros in the South.

Two well known French sportsmen, MM. Derienne and Schoffier, have purchased an 80-h.p. Deperdussin hydro-aeroplane

and taken it down to the Riviera. It made its first flight there on Monday, when its owners took a trip on it from Antibes to Nice and Beaulieu and back.

## More Farmans for French Army.

IN the presence of a military commission and representatives of the Havre district, the three Farman biplanes given by the latter to the French Army were tested by Chevillard at Buc on the 23rd ult. With a load of 275 kilogs. the machines rose to a height of 660 metres in 7 minutes. Two Maurice Farman machines for the Army were also put through their paces by Maurice Farman and Bernard respectively.

## The Clement-Bayard Steel Monoplane.

IT is stated that in view of the success attained by Guillaux and Gastinger on their steel monoplane, M. Clement has decided to make a special addition to the works at Quai Michelet for the building of similar machines. Gastinger on Saturday flew a new two-seater machine before a military commission at Issy. On the previous Wednesday he flew from Pont Leroy to Issy in 1 hr. 50 mins.

## The Michelin International Cup.

THE rules for the Michelin prize for 1913 state that the prize will be given to the aviator who covers, in a closed cross-country circuit, before January 1st, 1914, the greatest distance, provided it exceeds 2,000 kilometres. Last year the prize was not awarded, so the cash prize is added to this year's amount, making it 40,000 francs in addition to the Trophy valued at 10,000 francs.

## An Honour for German Military Aviators.

ON his 54th birthday, which was celebrated on Monday, it was announced that the German Emperor had created a special decoration to be worn while on service by all flying officers who have passed the military tests. The decoration consists of a silver medal in the centre of which is an aeroplane surrounded by a laurel wreath.

## Prussia and her Frontiers.

FOLLOWING the recent orders by the Russian and Austrian Governments that aerial craft passing their frontiers must land at once, in default of which they may have military measures taken against them, the Prussian Minister of the Interior has issued a similar order.

## German Aviatress Weds.

FRAULIEN BEESE, the well-known German lady pilot, who carried out a little time ago some very fine flying on a monoplane at Johannisthal, was married there on Saturday last to Herr Boutard.

## An Aerial Prince Henry Circuit.

CONSIDERABLE importance has accrued to what was known originally at the Upper Rhine circuit by the announcement that the Kaiser will give a prize to the winner, while Prince Henry of Prussia has likewise given a prize, and has also consented to the competition being known as the Prince Henry circuit.

## Fatal Accident in Germany.

DURING the military manoeuvres at Magdeberg on Thursday week, a military biplane containing two officers fell from a height of 50 metres. The passenger, Lieut. Schlegel was killed instantly, and the pilot, Lieut. von Scheele, succumbed to his injuries in hospital the following morning.

## The German-Scandinavian Flight.

PROGRESS is being made with the arrangements for this competition, and Norway is now interested as well as Denmark and Sweden. The start is to take place at Berlin on June 22nd, and flying via Warnemunde, the competitors should arrive at Copenhagen the following day. Thence they will start on June 27th for Gothenburg via Malmoe, going on to Frederikstad, in Norway, the next day and finishing at Christiania on the 29th. The prizes are to be £4,000, £2,400 and £800, while the first 15 competitors will receive £40 or £60 for each stage covered.

## Cross-Country Flight in Italy.

ON his Blériot monoplane, Maffei on Saturday flew from Lugano to Milan, a distance of 70 kiloms. in 52 minutes.

## A Fatality at Trinidad.

WHILE making a trial flight preparatory to giving exhibition flights at Port of Spain, Trinidad, Frank Boland, who has for some time been experimenting in America with a biplane fitted with a peculiar arrangement of ailerons, met his death through the machine falling.

## Another Argentine Fatality.

WHILE flying over Villa Lugano, near Buenos Ayres, on Monday, Eusebione fell with his machine from a height of 70 feet and was killed.



## AERONAUTICAL ENGINES.

Paper read by A. GRAHAM CLARK before the Institution of Automobile Engineers.

(Continued from page 101.)

**The Gyro Motor.**—This rotary engine employs an interesting form of inlet valve construction which is shown in Fig. 16. The valve is placed in the head of the piston and is operated by a lever. Upon an extension from the top end of the connecting rod a second lever is pivoted, the free end of which makes contact with the first lever near to its fulcrum. The method of operation is extremely simple. By centrifugal force the mass of the lever supported on

the side of the lever nearest to or farthest from the valve by the oscillation of the connecting rod, so will the valve be opened or closed—the period of opening being 180 degrees. It will be clear that this effect will be produced on the power stroke of the piston, but on account of the high pressure within the cylinder, it will be insufficient to open the valve.

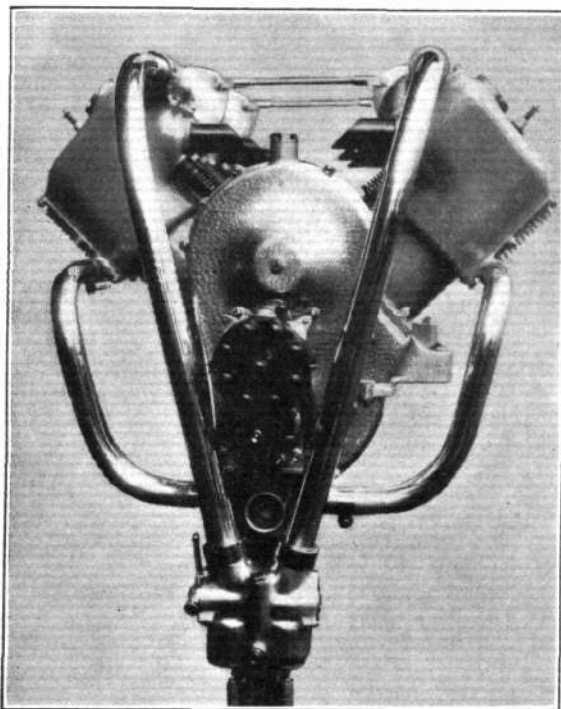


Fig. 17.—100-h.p. Panhard Engine.

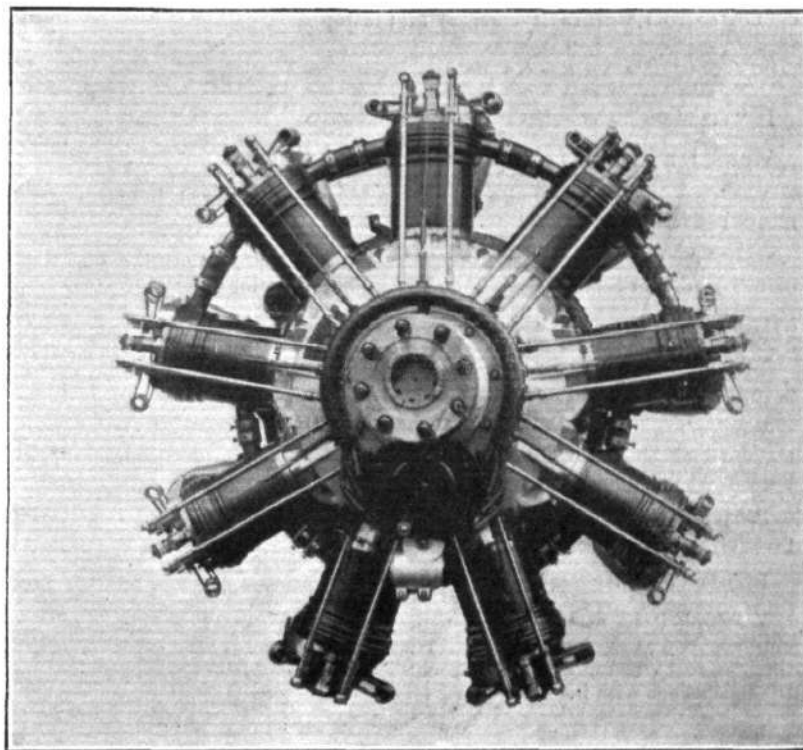


Fig. 19.—110-h.p. Salmson Engine.

the rod is thrown outwards and presses against the valve operating lever, so that, according as the contact is made on

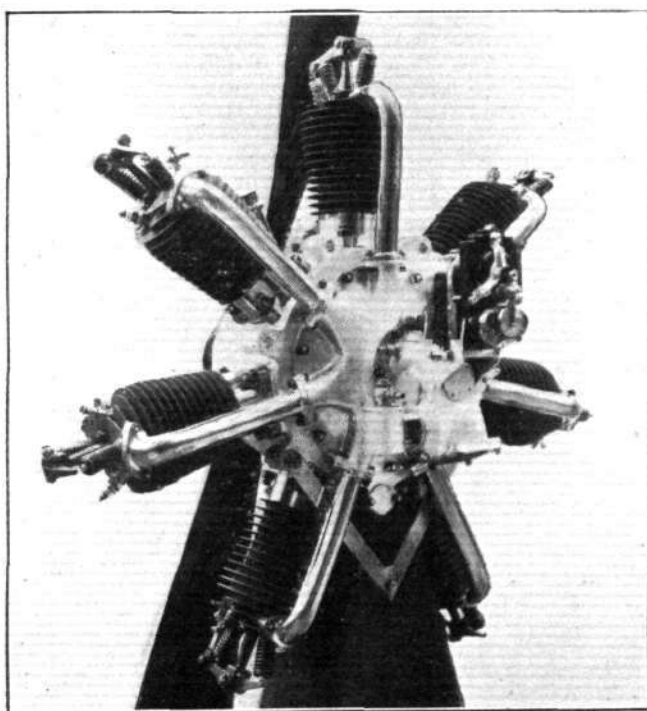


Fig. 18.—95-h.p. R.E.P. Engine.

Auxiliary exhaust ports and guard plates to prevent oil reaching the valve and so entering the cylinder are provided, but it would appear that the oil consumption is likely to be higher than is indicated by the figure given in Table III, since it would tend to collect, under the action of centrifugal force, around the circumference of the guard plate, and therefore, when the lower edge of the piston reaches the level of the auxiliary ports, the oil would be ejected into the atmosphere.

**The 100-h.p. Panhard Engine** is illustrated in Fig. 17. This engine has eight cylinders arranged in Vee fashion in sets of four, each set being cast *en bloc*, a rather unusual construction for engines of this class. On the sides is a large ribbed aluminium coverplate to the jackets; while to assist in supporting the overhanging weight of the cylinders two light tie rods are employed.

The propeller is geared down by attachment to an extension from the cam-shaft, a method employed in a large number of Vee engines including the Renault, De Dion, &c. The extremely long inlet pipes from the carburettor are very noticeable.

**The R.E.P. Motors.**—The special form of cam gear referred to in a paper read by Mr. J. S. Critchley before this Institution in 1909 is still employed. It is formed by a groove on the side of a disc within which rollers attached to the side of the valve plungers engage and which is rotated in a direction opposite to that of the engine. The groove is plus and minus a circle in order to alternately pull and push the rod actuating the valves. It would appear, however, that although the arrangement is simple, it would be subject to great wear owing to the high linear velocity at which the cam is operated. Two cranks are used on all models.

The 90-95-h.p. engine is shown in Fig. 18.

**The Renault Engines.**—The two special features in these engines are that they are cooled by air drawn through a casing fitted over the cylinders by a fan driven by the crank-shaft; and that the drive for the propeller is taken off the cam-shaft, thereby enabling a low propeller speed to be attained without sacrificing the power/weight ratio. The former is advantageous when an air-cooled

system is intended to be used, as more efficient and uniform cooling can be replied upon; at the same time it must not be forgotten that the weight of the casing and fan, together with the fins on the cylinders, may (except in very special cases) raise the weight per b.h.p. considerably, while the lower mean effective pressure normally obtained with air-cooled engines may entirely eliminate any advantage it might otherwise possess.

The Salmson Engines with water-cooled radial cylinders belong to a class of which there are few representatives. The difficulty in engines with cylinders so disposed lies in devising an efficient system of water circulation, but it has been met in the engines under consideration by the arrangement seen in Fig. 19. A centrifugal pump discharges water to the heads of the two lowest cylinders, from whence it emerges at the top end, passes to the

inner ends of the jackets of the two cylinders next to them, out at the same ends of the jacket but on the opposite side, and so on. It would appear that there is some possibility of the overheating of the cylinders next to the two lowest ones, especially as the water spaces at the ends of the cylinders are rather narrow, while the division of the stream of water by branch pipes does not ensure the circulation of water on both sides in the event of the formation of steam on one side; at the same time from the more or less vertical direction of flow a steam lock is hardly to be expected.

The peculiar springs employed for closing the valves are clearly shown in Fig. 19. The timing gear is driven by a pinion on the crank-shaft, through two wheels on a lay-shaft carried by the crank-case and back to the cams which are carried on a sleeve surrounding the crank-shaft. (To be continued.)

## THINGS WE SHOULD LIKE TO KNOW.

Is "Aviation" a very hard word to pronounce.

Wasn't it referred to at a recent dinner as "Aeration."

Aren't aerodrome mechanics hard-working, good-natured, jolly nice set of fellows in every way.

Wouldn't "MECHANICS' BENEFIT" look well as a poster heading on a Saturday or Sunday during the season, and do a lot of good.

May we hope to see it carried out.

Who is going to pay for the alteration of the monoplanes already delivered to the Government.

Wouldn't a good pilot with a passenger-carrying hydroplane stationed at Dover or Folkestone, during the summer, find it a paying business making trips to "La Belle."

Because a little spirit makes a propeller torque need the compression strut.

Isn't he often staggered himself with Gnome more.

Wouldn't it be as well to raise the nameboard over the main entrance gate at the bottom of Collindale Avenue, which just clears the 'bus seats, before some of the outside passengers involuntarily try conclusions with it.

Have you seen this, and can you explain it? When watching a monoplane going "all out" frequently momentary glimpses are

obtained of the propeller quite stationary, during which time both blades can be distinctly seen.

Whether the visitors to Hendon on Sunday last were quite satisfied that, after watching Hamel and Desoutter, they had seen some Flying—with a capital F.

Whether Hamel would like to try one of his "corkscrew hair-raisers" on the machine shown on the "Charlie's Aunt" poster.

A correspondent of a London daily paper, writes to claim for his father the honour of being the first cab-driver to fly in an aeroplane, and adds as an after-thought, that he is the driver of a four-wheeler. Is he now thinking of having a Gnome fitted to the back of his one horse-power chariot, and will he have his cards inscribed "JEHU GROWLER, F.C.T.F."

If the paper clothing reported to have been worn by Bielovucic when crossing the Alps was made of FLIGHT, owing to its well-known circulating properties.

Whether the War Office 4s. per night subsidy for housing accommodation, as required, of service planes, at private aerodromes throughout the country, is to be paid monthly or quarterly.

Why aeroplane-passenger-diarists should use wooden lead pencils, which require sharpening and are always "going out," for making notes when other forms are available.

"WILL O'-THE-WISE."

## AIRSHIP NEWS.

### New Dirigible Station in Germany.

THE "Delag" Society is considering the question of building a hangar for Zeppelins at Cannstadt, near the Mercedes works and close to the Elekkon hydrogen works. At Leipzig a military aerodrome with a Zeppelin dirigible shed is being laid out at a cost of £60,000, of which the greater part was subscribed in the district.

### New Zeppelin for German Army.

WITH military observers on board, the new Zeppelin cruiser "Ersatz Z1" left Oos, near Baden Baden, where she is stationed for the present, about 6 p.m. on Friday last week, and after 16 hours in the air, she landed safely before her hangar at 10.30 on Saturday morning. The speed was said to be 46 m.p.h., while a height of over 4,000 ft. was attained. The airship arrived at Oos from Friedrichshafen on the 20th ult.

### More German Manœuvres.

It is proposed to carry out a series of grand manœuvres in Germany during February and the first half of March with the L1, the L.Z. 2, the L.Z. 3, the Hansa and the Schutte-Lanz.

### German Government and Schutte-Lanz Firm.

It is announced from Berlin that arrangements have been concluded between the German Government and the builders of the "Schutte-Lanz," by which the latter agree to build airships only for the German Government, who will guarantee sufficient orders to keep the works going.

### Death of Col. Trollope.

It is with great regret that we learn of the death of Col. F. G. Trollope, who passed away last Tuesday morning, following a severe attack of pneumonia. As President of the Kite and Model Aeroplane Association and a late Vice-President of the Aeronautical Society he was an enthusiast whose services were of great value to the movement. His personality will be greatly missed. We tender our sincerest sympathy to the late Col. Trollope's relations and friends in the sad bereavement which they have sustained.

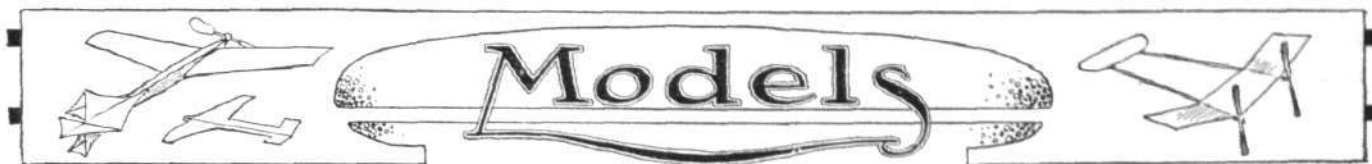
### An Inclinator.

AEROS, LTD., are perfecting a new form of electrically controlled inclinograph, the purpose of which instrument is to record on a revolving paper chart any variations in the lateral and longitudinal inclination of the machine, whether it be an airship, an aeroplane, or a submarine to which it is affixed. In essence the device consists of two balanced sectors pivoted independently in vertical planes at right angles to each other. One of the sectors detects changes in the longitudinal inclination and the other changes in the inclination laterally. The sectors themselves are cast from a magnetic metal, and around their peripheries are parallel resistance wires insulated from the sectors by strips of fibre. As the sector swings with the inclination of the machine, so a pair of rollers fixed to the baseboard of the device and having contact with the pair of resistance wires, short-circuit lengths of these wires varying, from period to period, with the inclination of the machine from the horizontal. Variation in the intercepted lengths of these wires, and consequently in their electrical resistance, is detected by means of a battery and ammeter in the circuit. The sectors are "damped" by magnetic influence. The ammeter is calibrated to read degrees of inclination. The recording instrument, which works in conjunction with it, is at present in course of construction. Lieut. Cecil Marks and Messrs. E. C. Midwinter and N. A. Feary have devised this instrument, and are joint holders of a patent protecting its novel features. Aeros, Ltd., are also engaged upon the construction of a new form of speed indicator for aeroplanes.

### Wood for Aeroplanes.

MR. JAMES P. FRASER and MR. GEORGE D. BEGG, the proprietors of the old-established bent timber works of Henry Matthews and Co., Ilford, have now changed the title of their firm, which will in future be known as Fraser, Begg and Co., bent timber manufacturers, Hope Works, Ilford. Mr. Begg, who has been a member of the Royal Aero Club since the early days of FLIGHT, invites aeroplane manufacturers to visit Hope Works and see the quality of the timber used for aeroplane construction. Mr. Begg understands exactly what aviators require, and he assures us that his firm can supply straight or bent timber within three days of ordering, their motto being "Best Quality and Quick Delivery."





Edited by V. E. JOHNSON, M.A.

### The Affiliation of Model Clubs.

MORE than a year has passed since the affiliation scheme of the Kite and Model Aeroplane Association was made public, and so far only one club (the Bristol and West of England) has become affiliated. At the present moment, the club which has just become affiliated is in all probability the leading provincial club, and others will, no doubt, ere long follow suit. It is hard to understand the extraordinary hesitancy that has been shown in this matter. Even supposing, for the sake of argument, that the advantages of so doing were of the smallest, the mere fact of the various clubs, both town and provincial, being linked together in this manner gives both of them a standing which they would not and cannot hold individually. Possibly, some of them have waited to see if the base on which the K. and M.A.A. itself stood was a stable one, likely to endure or of the same ephemeral existence that they knew from personal experience had too often been the case with respect to other model clubs. Since FLIGHT first came into being (counting both births and resurrections), very little short of a hundred model clubs have been started in the British Isles. How many are in existence at the present time, and how many are doing anything as a club to further the scientific side of model aeroplaning or help forward a national, as apart from a local, interest in the sport? If the club movement is to do any good in this country, if it is to be worth anything as a national asset apart from a mere holiday pastime of (we are afraid) very local interest, it is undoubtedly the duty of every club to become affiliated to that body which has been for some considerable time the recognised leading club in this country, officially recognised by the one and only body capable of bestowing such recognition.

The Association, or to speak more correctly, its indefatigable secretary has worked tremendously hard to raise it to the position which it now occupies, and the present moment is a most auspicious one for aeromodellists throughout the country to show their appreciation of such efforts by urging on the secretaries of the clubs to which they belong the value of the affiliation scheme from a national point of view. There are, of course, other advantages, and as the hands of the Association were strengthened so these advantages could be increased and added to. But we prefer here to point to only this one—a purely unselfish one from every point of view. To non-club members there always remains the membership of the Association. At least a hundred new members—not mere honorary members, but real practical aeromodellists—are urgently wanted at the present time if the Association is to efficiently carry out the work it has now in hand. In the past it has been compelled to rely very considerably on outside donations, which have been most generously given. Now this should most certainly not be the case—any such Association ought to be in the main self-supporting—able to stand on its own legs. As the secretary said in his letter in last week's issue: "For the past three years the Association has carried out, at considerable expense, a series of competitions that have done much to foster model aeroplaning in this country." It would not, we are sure, be too much to say that no other similar club in the world is able to show so excellent and progressive a series of competitions. The coming Model Show at Olympia, in which the Association is rendering every assistance in its power, promises in every way to be a record one. If aeromodellists in this country have the welfare of model aeroplaning really at heart, they can do nothing that is better calculated to further the cause than by becoming members of the Association—the yearly subscription to which is 5s.—a sum of money so small that no objections can possibly be raised on this score.

### Scientific Model Testing.

We have much pleasure in publishing the following communication from Mr. G. H. Kilshaw, whom, it will be remembered, was quite recently awarded the first FLIGHT Certificate of Merit.

"As an aeromodelist, who is of the belief that the properly constructed or scientific model aeroplane can be made the object of experiments with respect to stability, and that it can be sufficiently relied on as a method of benefit to its larger craft, the suggestions contained in the following intended programme may be worth perusal.

"Since bench tests are considered unsatisfactory in the light of the present knowledge of the various actions in relation to one another with respect to stableness of design, I have come to the conclusion that since it is hardly likely that a pilot is going to sit mum in an aeroplane set to do a trip on a gusty day of, say, a circular flight

with fixed controls, that may be a danger to his safety, and since hardly anyone but a madman would attempt to set in full flight\* a pilotless full-sized machine for the purpose of testing its stability, the model is the only remaining thing to experiment with.

It is my intention to construct a series of wing planes of the various accepted types of stable designs—such as the ordinary upward dihedral angle wing—the upturned wing tip, the washed-out wing tip, the down-pressure wing tip, vertically fitted fins, and others. A single fuselage will be constructed of streamline form and made to fit each of the wings to be tested in turn—which ought to ensure the same conditions of weight, power, and resistance, apart from the planes themselves and enable the various designs to be tested under similar working conditions, a point too often overlooked when comparison is being made. It is intended, since large models are to be used, say of dimensions not under 3 ft. 6 ins. span and of length 3 ft. as a minimum, and also taking into account the fact that it is proposed to save weight of running gear by the adoption of a method of launching after the principle of the Wrights—it will be possible to fit a recording stability device of light design into the fuselage. Designs are to be made and tested for this purpose, and will probably weigh under or a little over 2 ozs.

"It is thus thought that records of actual action during flight can be obtained that can hardly be of anything but benefit. Should, however, nothing worthy of note result from these proposed tests, it will at least be a step to try and establish or find a method; that should be the chief aim of every earnest model enthusiast—to make an effort to find to what extent a model aeroplane can be relied on in its action, as compared with that of its larger type—the full-sized machine. Suggestions from readers of FLIGHT would be welcomed and interesting no doubt, and criticism of the above proposals are invited."

It is, of course, work of this and a similar character that is wanted, and we wish Mr. Kilshaw every success in his endeavours, but we are of opinion the span must not be less than 5 ft., also the lack of a proper rising and landing chassis and the proposed method of launching are open to criticism. Light self-registering apparatus of a weight of about 2 ozs., supposing such can be constructed, would undoubtedly be of considerable value, because a power-driven model (a biplane of some 5 to 6 ft. span) could easily carry such and rise off the ground in the usual way—such registering apparatus must of necessity be extremely fragile and could scarcely withstand the shock of landing. If a hydro-aeroplane were used, and the alighting effected on water, then this risk would, practically speaking, be avoided.

It is obvious that the above series of experiments which our correspondent proposes to attack single-handed could be far more expeditiously handled by a club—but work of this character does not at present, at any rate, appear to appeal to the general run of clubs—of course, there are exceptions; for instance, we have this week received a copy of the annual report and balance sheet of the Stony Stratford and District Kite and Model Aeroplane Club, which has recently been so fortunate as to become the possessor of a glider, presented to them by Mr. Wynn, of Castlethorpe, and one of whose members is busily engaged in working out the "X" of the most successful models in the club, and who has already made some very accurate calculations with respect to the efficiency of some of his own models; and there are, of course, other clubs, many of whose members do really take a keen interest in the science of model flying. Still, we are afraid these are the exception and not the rule. Mr. Kilshaw says, in the letter accompanying his communication, "My impressions of model clubs are not of the best. I have been a member of two, and I found that the thunderbolt type of model is given too prominent a place, mainly on account of its spectacular displays."

It would undoubtedly be a very good thing if every model club, more especially the smaller ones, owned one (large) model in common, apart altogether from the smaller ones owned individually, with which a series of experiments (with some definite aim in view) were made, so much time being allotted every flying meeting. There are, we know, many difficulties attending such a course, but they are not insuperable, and when once some definite aim or series

\* No one would, of course, think of setting in free flight a pilotless full-sized machine in a populous district, and over even a sparsely-peopled land, the experiment would not be without danger; but if we take the case of a pilotless hydro-aeroplane on the open sea, set to circle, say, first hand knowledge of the greatest value might undoubtedly be gained by such means, with a minimum of risk, supposing even such to exist at all.—V. E. J.

of tests had been decided on, it surely should not be either a very difficult or onerous burden for each member to contribute his share to the best of his ability. Moreover, such a course of procedure should do much to bind the members together under a bond of common interest, which mere flying competitions do not do; in fact they sometimes have, we are afraid, the opposite effect. Everybody for himself and devil take the hindmost may be an admirable policy for all save the hindmost, but it is not a policy which is going to place this country where she ought to be, where it is not too much to say she must be if she is to retain her present position, viz., at the top of the aeronautical tree.

## Harrow and District Model Aero Club.

Mr. M. F. Daniels (Station Road, Harrow), writes us as follows: A model aero club has been established in this district. I might mention that although we have been slowly prospering we are greatly in need of support, which so far has been very slow in coming in. We have at present some 15 members and as the subscriptions are very low (to enable us to get members) we need many more members to keep it going, as we are ambitious and are in hopes of having a club workshop and making it a local attraction.

## KITE AND MODEL AEROPLANE ASSOCIATION.

### Official Notices.

#### British Model Records.

|   |                |                       |            |
|---|----------------|-----------------------|------------|
| Hand-launched ...                       | { Distance ... | A. E. Woollard ...    | 477 yards. |
|   | { Duration ... | A. F. Houlberg ...    | 89 secs.   |
| Off ground ...                          | { Distance ... | G. Rowlands ...       | 232 yards. |
|   | { Duration ... | A. F. Houlberg ...    | 51 secs.   |
| Hydro, off ground ...                   | { Distance ... | G. P. Bragg-Smith ... | 25 secs.   |
| Single-tractor screw, hand-launched ... | { Distance ... | F. G. Hindsley ...    | 173 yards. |
|   | { Duration ... | F. G. Hindsley ...    | 36 secs.   |
| Do., off ground ...                     | { Duration ... | H. R. Weston ...      | 21 secs.   |

**Aero Exhibition, Olympia.**—Members should note that all entries should be sent in at once, as February 5th is the last day for receiving same, and any arriving after that date will be returned. Cards giving name of exhibitors, official numbers to be fixed on machines and passes for the Exhibition will be issued in due course. All machines must be in position on Thursday, February 13th. Members can therefore send or take them on Tuesday, Wednesday and Thursday, February 11th, 12th and 13th. None will be accepted before or after those dates. They can be taken away after 10 p.m. on Saturday, 22nd, but not before.

**Flying Trials.**—The Sub-Committee appointed to view and select the most suitable ground and water for these trials visited several within easy distance of London on Thursday last and decided that the trials in Classes 1, 2A and 2B should be held at the London Aerodrome and the hydro trials at the Welsh Harp on Saturday, March 1st. If the Committee find the number of entries too large to get through in one day, then the ground trials will be held on Friday, February 28th, and the hydro trials on the Saturday, March 1st, but this point will be decided after the 5th, on which day entries close.

**Annual General Meeting.**—This will not be held till March, on account of the Exhibition, but the Hon. Secretary will be pleased to receive all notices of motion before February 22nd, together with any nominations for the various offices.

**Presentation to the President.**—The Council on Thursday, 23rd ult., presented Lieut.-Col. F. C. Trollope with a cigar cabinet as a slight token of esteem for the kindness and courtesy extended to them and the members of the Association during the year.

**Official Trials.**—The Paddington and District Aero Club have invited the Association to hold the next trials in March on their ground at Sudbury. This has been accepted with thanks, the date fixed being March 15th, at 3 p.m.

**Lecture.**—A few tickets for the Aeronautical Society's lecture on Wednesday, February 13th, have been placed at the disposal of the Hon. Secretary, Mr. L. Baird, A.R.C.Sc. will read a paper on "The Law of Similarity connecting Models and Full-sized Machines" and Sir William White, K.C.B., F.R.S., will preside. As the tickets are limited application should be made at once and will be allotted in order of application.

27, Victory Road, Wimbledon, S.W. W. H. AKEHURST, Hon. Sec.

## MODEL CLUB DIARY AND REPORTS.

CLUB reports of chief work done will be published monthly for the future. Secretaries' reports, to be included, must reach the Editor on the last Monday in each month.

**Aero-Models Assoc. (N. Branch)** (15, HIGHGATE AVENUE, N.).

FLYING as usual at Finchley during February.

**Monthly Report.**—Jan. 4th, very good practice put in by Messrs. Hindsley, Weston, Fletcher, and others. Especially fine were the flights made by Mr. Hindsley's and Mr. Weston's tractors, which repeatedly flew 200 yards. Jan. 18th, three records set up by members in the K. and M.A.A. trials. Mr. Hindsley obtained a duration of 36 secs. with his tractor, and 173 yards distance, whilst Mr. Weston constituted a new record for r.o.g. tractors with a duration of 21 secs. Jan. 25th, splendid afternoon, members in full force, and excellent flying, Mr. Hindsley's old tractor mono. and Mr. Jones' tail-behinder doing well. Mr. Waring's tractor model made flights up to 26 secs. duration. Mr. Tosh had a huge tail-behinder, the span of the plane being about 36 inches.

**Brighton and District ("KINGSLEIGH," KINGSWAY, HOVE).**

**Monthly Report.**—During the past month the youthful members have been quite busy. Some good machines were brought from school by the following members, viz.: Barca, Kerruish, Aitken, Melors, &c. Kerruish with new tractor did 87 yds. in one flight. In spite of bad weather all over the country, the wind at Shoreham aerodrome has, as usual, been very steady and practically free from gusts, making it ideal for all kinds of model flying.

**Bristol and West of England (CLIFTON DOWN HOTEL, CLIFTON).**

**Monthly Report.**—The club stand at Bristol Coliseum has proved a great attraction—an interesting display of models being on view. The models were judged by Messrs. C. P. Pizey, C.A., and E. A. Vessey. Prizes to the value of

To do this, more members are required, to obtain the necessary amount to carry out the above intentions. We have been obliged to have competitions to make it interesting to the members—which have taken most of our money. Everything possible is being done to push it. Will anyone wishing to join kindly communicate with our correspondent at the above address?

## Model Club for Wembley.

Mr. H. Lane (79, London Road, Wembley) writes saying that a model club has been formed in the above district under the title of the "Wembley Model Club," full particulars of which can be obtained on applying to the above address.

## Replies in Brief.

**A PYLON KEEPER.**—Your communication to hand, but the "clip" was not enclosed.

**L. G. TUCKER.**—It looks as if your model was somewhat under-powered. Try two more strands. If this does not improve matters shift the main plane back a little—the tips being slightly upturned; in any case you should be able to overcome your difficulty by shifting the main plane along the fuselage until you obtain the best results.

£3 were awarded as follows: Design.—1st, A. V. Tivy (17 oz. tractor biplane with variable surface tail, controls, &c.); 2nd, R. T. House (tractor monoplane, described and illustrated in FLIGHT, Nov. 30th and Dec. 28th, 1912). Construction.—1st, C. W. Tinson (14 oz. Canard monoplane, former prize winner); 2nd, H. G. Lee (12 oz. military biplane). Hydro-aeroplane Prize.—W. A. Smallcombe (monoplane, 7 oz.). All the exhibits were rubber-driven flying models. Several showed a commendable amount of detail—two of the first prize winners being practically scale models of full-size machines. One of these latter will be shown at Olympia. A number of these machines will be on view for a few weeks longer, and visitors to Bristol are recommended to pay the Coliseum a visit. The club biplane glider is now under repair, and good work will probably be done with this machine at Portbury before long. A proposal to purchase a "Weiss glider" is now before the committee of the B.W.E.A.C.

**Croydon and District Aero Club (Sec., 136A, HIGH STREET).**

**FEB. 2ND.**—Competition for tractors and distance models at Mitcham Common, at about 3.30 p.m.

**Monthly Report.**—January has been a fairly busy month for the club, and numerous models have been made. Mr. D. Pavely has had some splendid flights with a new tractor monoplane. His best flight was 147 yards. Other tractor models have been constructed by Messrs. Hart, Roden, Smither and Thumwood, and on Jan. 19th Mr. P. Hart had a flight of about 100 yards in a gale. Mr. C. Smither has made a large surfaced floating tail type monoplane which flies very nicely. He is now constructing a hydro-biplane of novel design. Big distance flights have been made by Messrs. Bell and Pavely. On Jan. 26th an open competition was held at Mitcham Common, for distance models and tractor monoplanes. For the distance models, Mr. Plummer, of the S. Eastern Aero Club, was first, with a magnificent flight of 553 yards, with his floating tail monoplane—Mr. Bell was second, with 206 yards.—He experienced very bad luck, as before the competition commenced he was getting fine straight flights, but later his model would only fly in circles. Mr. Carter also had good flights as also did Dr. McMunn—this gentleman also had very bad luck during the competition. Mr. Plummer also won the tractor competition with a flight of 152 yards, a splendid performance, and was closely followed by Mr. Martin with 140 yards. Mr. Davies also had good flights. Mr. P. Hart's model alighted in a pond in a trial flight, and would not fly after. Members of the club who turned up had the pleasure of meeting M. H. B. Clark, Sec. of the S. Eastern Aero Club, who very kindly assisted in measuring distances, &c. The club has room for more members, and the sec. would be pleased if anyone interested would write to him at above address.

**Hendon Model Aero Club (20, AUDLEY ROAD, W. HENDON).**

**FIXTURE LIST.**—Flying every week-end at Bowyer's Farm aerodrome pending permission to use new grounds at Kingsbury. Weather permitting, on Saturday (to-day) competition for propeller trophy. Prize is for best all-round flight, marks being awarded for (i) distance, (ii) duration, (iii) altitude, (iv) stability, (v) planning down. Members please note this (the only) official announcement.

**Monthly Report.**—Considering the inclement state of the weather, very good practice has been indulged in at Bowyer's Farm aerodrome, and a good number of members have gained useful knowledge of the essential qualities for stability on a model. Lawrence has raised the duration record to 70 secs. with a 0-1-1-P2 machine, having the tips of the main plane brought well back and turned up; this model's stability is remarkable. Dirdge has been very successful with a r.o.g. monoplane, making excellent flights in a gusty wind. Short has been flying an old r.o.g. biplane of the 1-2-0-P2 type, which is now being rebuilt. The biplane weighs 16 ozs. in flying order, and rises successfully off a strip of oilcloth 6 yds. long. Hills out with 1-1-0-P1 model; Lawrence also flying one of the same type. Hedges has finished ½-h.p. petrol engine, but is having trouble with ignition. Short's ½-h.p. petrol motor is nearly finished now, and is intended for scale Maurice Farman biplane. A new member, H. Hills (jun.), has joined the club. Will members please note that the clubroom is open to them on Thursdays, Saturdays and Sundays for meetings, &c., although models may be brought and fetched at any time.

**Paddington and Districts (77, SWINDERBY ROAD, WEMBLEY).**

**FEB. 1ST,** flying at Sudbury as usual.

**Monthly Report.**—On Jan. 11th the secretary, W. E. Evans, delivered a lecture on "Meteorology," which was greatly appreciated by the members. At the third annual general meeting of the club, on Jan. 18th, the accounts for the past year were read and passed. The club was in a sound financial position, but the small balance in hand would have been considerably augmented if several members of the butterfly type had not gone into the chrysalis stage. The members were of opinion they could not do better than re-elect the secretary, Mr. W. E. Evans, and the committee, Messrs. M. Canning, T. Carter, C. Dutton, C. Levy, M. Levy and H. Woolley, all of whom had worked most assiduously in promoting the general welfare of the club. Under their management an interesting season's sport is assured. Jan. 14th and 21st, members visited the Paddington Radical Club to hear two lectures on "Principles and Practice of Aeronautics," by Mr. Bertram G. Cooper (Secretary of Aeronautical Society). His expositions of the why and wherefore of aerial navigation were listened to with the keenest interest, and members were delighted at having this opportunity of learning something from so eminent an exponent of the subject as



Mr. Bertram G. Cooper. The club paid a visit to the South Kensington Museum on Jan. 25th, where a temporary collection of aeronautical apparatus is on exhibition. A very enjoyable and instructive evening was spent amongst the aeroplanes, propellers, and various instruments connected with aviation. A wind tunnel containing a model B.E. biplane excited considerable interest every time it was operated by the attendant. Other objects of interest were the illuminated negatives illustrating the flow of water round obstacles and aerofoils. Those interested in engines had an opportunity of closely inspecting the Gnome and Green aero engines. The R.A.F. four-bladed propeller acted like a magnet on the secretary. With the store of information gained by members during the past month, considerable advancement in model construction is anticipated during the coming season.

#### Reigate, Redhill and District (8, BRIGHTON ROAD, REDHILL).

**Monthly Report.**—The past month has seen much active work. The quarterly competition for Col. R. H. Rawson's (the President's) fine silver challenge cup was held on Dec. 21st. Mr. J. W. Burghope succeeded in winning it with 226½ marks. Mr. W. Key was second with 147½, and Mr. M. H. Wilson was third with 111. The weather was vile, a very high and gusty wind blew, which exactly suited the heavily-loaded models flown. Despite the adverse conditions, Mr. Burghope's machine succeeded in covering over 250 yards, and Mr. Key put up a duration of 351 secs. Had the latter's model flown straight it would have won the trophy; r.o.g. machines were flown, the average weight being 10 ozs., and the average loading 12 ozs. to sq. ft. In future the competition will be held three times a year. Eight machines are under construction for Olympia. A branch of the club has been formed at East Grinstead by Messrs. H. Moon (late of this club) and Mr. H. Smith (of the Croydon club). Mr. Moon is branch hon. sec. A great deal of flying has been done at East Grinstead lately by these two members. A good deal of flying has been done during the month by Messrs. Norton, Sutton, Key, R. and M. Wilson, Burghope, Oram, Hoyle and Hooton. Mr. G. Morris testing a novel glider. Social teas are now a regular feature of the club's "work."

#### Scottish Ae.S. ("ROCHELLE," LINESIDE AVENUE, RUTHERGLEN).

FEB. 1ST, r.o.g. competition at Paisley racecourse. Feb. 8th, hydro-aeroplane demonstration at Maxwell Pond. Feb. 15th, monthly competition at Paisley racecourse. Feb. 22nd, hydro-aeroplane meeting at Maxwell Pond.

##### Scottish Model Records.

|                        |              |                    |           |
|------------------------|--------------|--------------------|-----------|
| Hand-launched ...      | Distance ... | J. S. Gordon ...   | 2,006 ft. |
|                        | Duration ... | Jas. Myles ...     | 65 secs.  |
| Off-ground ...         | Distance ... | Wm. Craig Boyd ... | 739 ft.   |
|                        | Duration ... | Wm. Craig Boyd ... | 33½ secs. |
| Tractor, single screw— |              |                    |           |
| Off ground ...         | Duration ... | J. S. Gordon ...   | 16½ "     |
| Hand-launched ...      | Duration ... | J. S. Gordon ...   | 10½ "     |
| Hydro-aeroplane ...    | Duration ... | C. F. Arthur ...   | 21½ "     |

**Monthly Report.**—During the month of January little outdoor work has been done owing to the miserable weather conditions. On Jan. 3rd Mr. C. F. Arthur was practising with his hydro-bus at Whiteinch Pond, the model doing several fine flights of 20 secs. On 4th Mr. J. S. Gordon gave a display of the same nature at Maxwell Pond. 11th and 18th were blank dates owing to wet weather. On 25th, a hydro-aeroplane meeting was arranged to take place at Maxwell Pond. Again there was disappointment for the members and spectators owing to the pond being frozen over. Mr. Gordon, however, fitted his machine with small steel runners, and the new "aerosleigh" made about a dozen flights from the ice, the duration averaging 20 secs. each flight. Several speed trials were made with the planes removed and the terrific pace shown caused great excitement among the spectators. Notwithstanding the small amount of outdoor work done the workshop has been well attended and the usual monthly supply of new ideas has been forthcoming. The Drummond lathe is now nearing completion, the patterns being made and the castings finished off by the members, which work has proved both interesting and instructive.

#### Sheffield Model Aero Club (35, PENRHYN ROAD, SHEFFIELD).

**Monthly Report.**—The second annual general meeting was held at Broomhead's Dining Rooms, on December 28th, 1912, the following being elected for the present year:—President, Mr. E. W. Colver; Vice-President, Mr. H. Slack; Treasurer, Mr. G. H. Dewsnap; Hon. Secretary, Mr. C. F. W. Cudworth (35, Penrhyn Road); Hon. Assistant Secretary, Mr. R. E. Raynes (1, Baker Street); Committee, in addition to the other officers, Mr. J. P. Worrall and Mr. W. H. Bagshaw. The past year has proved a record one for the club. A special meeting was held on January 16th, when Mr. E. W. Colver sprung a great surprise upon the members by presenting a Silver Cup, to be known as "The President's Challenge Cup for Hydro-aeroplanes." This is to be competed for annually by club members only. Mr. Colver was heartily thanked by all the members for his generous gift, this being the second cup he has presented to the club, with the object of encouraging enthusiasm in aeronautics in Sheffield. The other cup is the "Colver Cup" for self-rising models. The club at present holds three Sheffield records—distance, duration, and self-rising models.

#### S. Eastern Model Ae.C. (1, RAILWAY APPROACH, BROCKLEY).

FEB. 1ST, at Kidbrooke, 2 p.m. to 5 p.m. Feb. 2nd, at Blackheath, 7.30 a.m. to 10 a.m.; at Lee, 10.15 a.m. to 12.15 p.m. Other flying will also take place at the Cricket Ground, Chislehurst, by the local branch, and on Mitcham by members of the East Surrey branch.

**Monthly Report.**—During the past month several members have been particularly active, although wretched weather has considerably curtailed the available time for outdoor experiments. One of the important incidents has been the successful debut of Mr. A. C. Rippon's large tractor monoplane. This resembles the "Antoinette" to a great extent, both in design and in the actual flying. The total weight of this machine is 12 ozs., and although it is driven only by a single skein of rubber, weighing 2½ ozs., it has repeatedly flown a distance of

100 yards at the Lee Aerodrome, and is also capable of making a flight of 22 secs., finishing with a short glide. This alludes to hand-launched flights; the model has not yet been thoroughly tested "off-the-ground." Mr. A. F. Chinnery has again been getting very good results with his gull's wing—tractor—monoplane, although some trouble has been experienced with the landing chassis, due to too rigid construction. Mr. R. W. France with his "Dep." tractor and a r.o.g. twin-propeller monoplane has made some good flights at Blackheath, and Mr. E. Campbell is obtaining better results from his tractor. He now proposes fitting a 4-bladed screw instead of the 2-bladed one at present in use. It will be interesting to watch if this gives better results as has proved to be the case with several other models where 4-bladed screws have been substituted for 2-bladed ones. Mr. A. D. Nicholls has been endeavouring to solve the problem of the lateral stability of his tractor biplane (it persists in side-slipping) by the aid of a fin and without resort to a large dihedral angle on the main planes. Mr. G. Brown has made numerous flights with his "racing" model, and has recently turned out a small and very interesting tractor biplane, which contains several new points in model construction. Mr. G. H. Westwood has made nice flights on Blackheath with a new "covered-in-body" tractor mono., which "gets off" in a remarkable manner, leaving the ground after a very short run, and generally finishes its flight with a glide. Mr. S. Hunt has been experimenting with his "power" tractor monoplane, which is driven by a 3-cyl. rotary steam engine, but success has not yet been attained. Mr. S. Grimston has been flying a tractor monoplane, and an "A" frame twin-propeller model; both machines flew well at the Nunhead ground. Mr. F. G. Peter, with his automatic-stability tractor monoplane (4-bladed screw), has done an enormous amount of work, and the continuous success of this model speaks well for his careful tuning-up. A new tractor biplane constructed by Mr. Peter has also made successful flights at Lee and Crofton Park. Mr. E. Hock has made some fine flights with a tractor, and Mr. L. B. Morris has been flying his very original single-propeller monoplane and a tractor mono. at Kidbrooke. The first mentioned—the only model of its kind in the club—is one of the most interesting on account of its splendid climbing angle and it invariably terminates its flight with a good glide. Dr. G. McMunn has again been making excellent flights with his 4-ft. "racers" at Mitcham Common. At this ground Mr. F. Plummer has also met with success. In open distance competitions, promoted by the Croydon and District Aero Club, Mr. Plummer succeeded in gaining both first prizes. In the first event this member's twin-propeller model flew 558 yards, and in the second contest his tractor monoplane made a straight flight of 152 yards. Mr. Bell (of the Croydon and District Aero Club) was runner-up in the former event, and Mr. W. Martin's tractor mono. was a good second to Mr. Plummer's with a flight of 142 yards. Mr. W. G. Billingham has obtained some very good results with his monoplane and biplane—both tractors—on which Mr. Billingham is conducting some special tests with a new type of tractor-screw. Messrs. F. Dixon, V. C. Wheeler and L. Brough are busy constructing models. Several members of the Chislehurst Branch have been active with their tractor models; Messrs. R. Dodd, F. Packham, A. Kemsley and S. Dodd giving creditable performances. Mr. R. Dodd is now making a "scale" Deperdussin, which should be a nice flyer. Mr. F. M. Bailey and Mr. B. Sutton have been testing tractors and Mr. G. H. Lee a twin-propeller model. Mr. W. R. Halnan has been obtaining nice flights with the secretary's tractor monoplane—A.B.C. 76—which is still going strong despite its age. Mr. A. B. Clark has been using his tractor biplane, which on one occasion made a flight of 159 yards. In addition his "Groves" biplane has been very successful, making good flights off the ground at Blackheath and Lee.

The subscription to the MODEL SECTION is now due and the secretary will be pleased to receive remittances.

#### Southgate County School Ae.C. (72, NATAL RD., NEW SOUTHGATE).

FEB. 1ST, tests for certificates. Feb. 8th, novices competition. Mar. 1st, hydro-aero competition.

**Monthly Report.**—Several good flights during the month. With the exception of some of the younger members the "flying-stick" is extinct. Results of r.o.g. competition, Jan. 18th: 1st, J. Reed, 521 ft.; 2nd, F. Ellinghaus, 307 ft. Jan. 25th: Certificates issued to J. Reed (1st class), 350 yards, G. Redottee and A. Herring (2nd class), each with flight of 40 secs.

#### Stony Stratford and District Kite and Model Ae.C. (OLD STRATFORD).

**Monthly Report.** January, 1913.—A members' general meeting was held on Wednesday, January 15th, when the members present were excitedly discussing the joys, &c., of gliding; this was the result of the secretary reading out a letter he had just received from Mr. Wynn, a local gentleman, who has been conducting experiments with the heavier-than-air machines. Members have not got into full stride yet for model flying, but the secretary is glad to report a little progress, and that members are building new machines. The next meeting is Wednesday, February 12th, at the clubroom. It has been proposed that, for the benefit of the junior members, the discussion take place before the consideration of business. Members please attend the above meeting, as there is a great amount of business to transact. The particulars to hand 72 glider are as follows: 32 ft. span, in three sections, fitted with an elevator; weight, 50 lbs.

#### Windsor Model Aero Club (10, ALMA ROAD, WINDSOR).

**Monthly Report.**—During the past month work has been confined to the glider and the show models. Extensive alterations have been carried out on the former, and its efficiency and appearance much improved. The tail boom system which was previously the machine's weakest point, is now its strongest, and much resembles the Caudron. After this machine has been finished with, it is the club's intention to build a controlled glider on Caudron lines. Experiments carried out with the present machine, show that a span of 32 ft. is excessive for body control alone, and on this score, somewhat dangerous. The club would like any enthusiasts in the locality to come forward and join them, and thus ensure a successful season's work.

## CORRESPONDENCE.

Correspondents communicating with regard to letters which have appeared in FLIGHT, would much facilitate ready reference by quoting the number of each letter.

#### The British Industry.

[1714] There is much truth in what "A Believer in Aviation and in England" says in letter 1709 about the difficulty in securing financial assistance. At the same time I think if one can put a proposition before a body of intelligent gentlemen of good financial standing which appeals to them as being sound, there should be no difficulty in getting the necessary cash to carry the matter through. Within

the last four months I had occasion to look for financial assistance to build an aeroplane engine with novel valve gear, &c.; my experience was, no one seemed anxious to find the cash until I had clearly stated my case and showed master patents as security for their money. Having satisfied themselves, with the assistance of outside expert advice, that there was a reasonable prospect of making money on the venture, the necessary money was immediately put up, and the engine is now nearing completion, of course, it is not a scheme on paper, an experimental engine has been running for nearly a year. It was described and illustrated in FLIGHT, June 1st 1912.

88, Pall Mall, S.W.

WILLIAM COCHRANE.

## Negative Angle Wing Tips.

[1715] In connection with this matter, perhaps it is well to draw attention to the point that, apart from any controversy on their merits, tests of negative wing tips would be well worth making with the object of getting information about what might be called the anatomy of gusts and eddies. If we tried two machines, weighing alike, and having the same air pressure per square foot of wing, one with and the other without, negative tips, the effect of variation of velocity across the span would be eliminated, and that of variation in angle of incidence, which I suppose may likewise vary, would be aggravated by the negative tips, and by the larger wings required in the same aircraft. In fact, negative tips which extinguished the influence of variation of velocity will leave the influence of angle-variation outstanding; such tips cannot balance it, because on the side where the greater angle of incidence on the main wing increases the upward pressure, the angle of incidence on the negative tip is diminished, and downward pressure reduced and *vice versa* at the other tip. With regard to Mr. Hume-Rothery's investigation, the inclusion of variation of angle of incidence, along with that of velocity might be described technically as making both  $U$  and  $\phi$ , or  $q$  and  $\phi$ , functions of  $z$ , instead of  $U$  alone. If I understand him aright, Mr. Hume-Rothery points out that the derivative moments which occur in Bryan's work can be balanced by others introduced by the negative tips if these be suitably designed. If, however, variation of angle be introduced, other derivatives come in, which cannot, I think, be balanced by permanent adjustments, because they depend on independent factors, namely the rates of variation along  $z$  of the velocity and angle respectively. I think I am right in assuming that difference in angle of incidence at opposite ends of the span is generally believed to occur in practice, as well as difference of velocity.

MAURICE F. FITZGERALD.

Monkstown, Co. Dublin.

[The condition laid down in Mr. Berriman's article is that the downward pressure on the negative tips shall balance the up pressure on the positive part of the wing for a motion of spin about the vertical axis. If the pressures are balanced at one speed of spin, then they will presumably be balanced for any other angular velocity within the range at which the lift coefficient remains constant. Considering each wing (*i.e.*, each half of the span) separately, the entire lift due to angular movement is supposed to be obliterated and a gust being defined as a relative spin of the wind is regarded as equivalent to an angular rotation of the wings, which by the hypothesis is not a movement that produces lift.—ED.]

## Monoplane Wings.

[1716] In the January 11th issue of your esteemed journal you published an article by Mr. Brewer entitled "The Collapse of Monoplane Wings," and I feel myself called upon in my own interests as well as those of the industry generally, to offer some criticism and point out the fallacy of Mr. Brewer's theories and arguments.

There is no doubt that there have been certain genuine cases of collapse in the air, but so far, nobody seems to have been able to discriminate between one accident of this sort and another, nor to take into account the characteristics of design and construction of the machines in question.

Mr. Brewer commences his article by referring to M. Blériot's well-known report on the subject, wherein he blamed the upper supports of the wings.

Now, admitting for the moment that it is possible for a machine in flight to sustain a downward reaction on the top surface of the wings, it is obvious that would be more in the nature of a blow than a continued pressure. Now even if the top wires fall under this strain, there would be no tendency for the wings to drop further than four or five degrees at the most before they would have to return to their natural position and take up their load again. The load would naturally be taken up with a severe jerk which would impose serious strains on (1) the main wires, (2) the wing spars and (3) the compression member between the two wings.

If these parts were not designed and constructed with an ample margin of strength, one or more of them might fail; in the first case the wings would just fold up, as in the case of M. Wachter's machine at Rheims. The wing spars would probably break in compression between the innermost stay wires and the fuselage, upwards, causing the tips of the wings to drop momentarily before the wing went to pieces completely. In the last case (3) the butts of the spars would move inwards, and then either upwards or downwards according to the position of the centre of pressure of each wing in relation to its supporting stay wires, and the wings would appear to break up or down according to the circumstances.

Now in some of the earlier monoplanes the back spars did not even have a compression member between them, but were simply housed in sockets against the vertical struts of a wire-strung

fuselage; and it is not at all unlikely that these verticals, subjected as they were to a severe bending strain, should have failed under any increased load.

In the above cases we have supposed that the top wires of the wings failed in the first instance, but in the event of a machine being subjected to a considerable overload, as for instance being flattened out suddenly after a steep *vol plané*, it is still possible for the wings to appear to break downwards owing to failure of the fuselage struts, should the spars be butted against them as explained above.

I am afraid that Mr. Brewer's theories about the movement of the centre of pressure will not bear a very close examination.

He starts by assuming that monoplane wings are set up with the wires slack enough to allow the wing tips to twist appreciably. I wonder what particular monoplane he is familiar with? Then, supposing it possible for this to happen, the twist could surely never equal the twist caused by full warp. If Mr. Brewer's "very small and imperceptible" twist is going to cause the complete reversal of pressure on the wing, I should fancy that full warp would turn the machine upside down in the twinkling of an eye. Further, Mr. Weiss, in his experiments with large models and man-carrying gliders, found that his wing tips still lifted appreciably, even though they were set at an angle of between 12 and 15 degrees less than the wings at the fuselage.

Again, if the "theory" were correct the "swivelling" wings of the Breguet would perform the most marvellous antics in flight. Perhaps it is not generally known that these wings "twist" so easily that making a proper sand test is practically impossible, as the wings turn and allow the load to slide off them.

Lastly, is the Nieuport which flies at a smaller angle of incidence than, perhaps, any other machine, more troubled by this phenomenon than, for instance, the Blériot, which uses a coarse angle?

It is curious that, because a few monoplanes have failed through causes and weaknesses which after all are not so very difficult to determine, almost every accident, from whatever cause is put down to wing failure. It must be the old principle of "Give a dog a bad name and hang him," and it is certainly not worthy of those who profess to have studied the subject.

In point of mere strength, and apart from aerodynamic properties, wherein the monoplane has proved itself over and over again to be vastly superior to the biplane, there can be no difference between a properly designed machine of either type. It is a comparatively simple calculation of strains and stresses, wherein an engineer is far more at home than a man who gives all his attention to the theories of flight.

Brooklands.

H. P. MARTIN.



## A French Prize for Safety Devices.

THE Committee of the French Union for the safety of aeroplanes has decided to offer a prize of 400,000 francs for the best arrangement for securing the safety of aeroplanes. The tests will be very severe, and include practical trials on a machine having a speed of over 100 k.p.h. Other prizes of 20,000 francs will also be awarded. The judges will include representatives of the Ministers of War, Marine, and Public Works.



## Aeronautical Patents Published.

Applied for in 1911.

Published January 30th, 1913.

22,025. W. H. NOSWORTHY AND S. J. PRESCOTT. Aerial machines.

Applied for in 1912.

Published January 30th, 1913.

200. J. G. PARSONS. Aerial propellers.  
550. G. H. SHORT. Wings or main supporting planes.  
3,588. V. K. VYVYAN. Control and propulsion of flying machines.  
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